

Thermo Scientific™ SampleArray™ Tube Handler

October 2014

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Chapter 1 - Notices

1. Safety

Before using the SampleArray instrument, ensure that you are properly trained in:

- The correct and safe operation of the SampleArray unit
- The correct and safe maintenance procedures for the SampleArray tube handler if you are involved in the servicing or repair of the instrument

Safety Standards

The SampleArray Instrument is CE compliant, TÜV certified, and CSA Certified. Product has been Tested according to

CAN/CSA C22.2 No.61010-1:2012



UL 61010-1:2012

EN 61010-1:2010

The product was voluntarily tested according to the relevant safety requirements noted above. It can be marked with the certification mark above. The mark must not be altered in any way. This product certification system operated by TÜV SÜD “Testing and Certification Regulations”. TÜV SÜD America Inc. is an OSHA recognized NRTL and a Standards Council of Canada accredited certification body.

Safety Labels

The SampleArray unit has a number of safety labels intended to protect the operator from injury, pay attention to these labels at all times. These labels include:

Label	Meaning
	Do not lift the Y axis gantry. The correct lifting procedure is described in Section 3.1
	Do not place hands under or close to the Y or Z axes while the unit is operating. The axes may move and present a hazard.

WARNING Within this manual, a WARNING notice indicates a potentially hazardous situation which, if not avoided, could result in injury.

1.2 Warranty

Standard warranty is 12 months or 150,000 tube movements as recorded by the cycle counter which can be accessed in the **Lifetime Usage Metrics** menu. See page 7-6. Enhanced preventative maintenance and service packages are available. Contact Thermo Fisher Scientific at the locations detailed in the contacts section below.

1.3 Contact Details

North America Contact (Main Office)

Thermo Fisher Scientific
75 Panorama Creek Drive
Rochester NY 14625
PH: +1 800 345 0206
+585 586 8800
technicalsupport@thermofisher.com

Europe Contact

Thermo Fisher Scientific
Robert Bosch Str. 1
63505 Langenselbold
Germany
PH: +49 (0) 6184 906 000
orders.labequipment.de@thermofisher.com

Chapter 2 - Introduction

2.1 Description

The SampleArray tube handler system allows storage tubes of varying sizes to be moved from rack to rack, with the ability to scan the tube barcode and measure the tube weight as part of the move.

Tubes can be moved to destination locations defined by a specific well location on a specific rack or to the next available well on a specific rack; this is termed an auto-fill move.

If there are problems with the barcode or weight measurements, various actions can be defined, including moving the tube to a Quarantine rack.

Source and destination racks are physically loaded onto the bed and the same layout is set up within the software.

Once all the required labware is loaded, the system can be started and the defined sequence of tube moves can run with no further user intervention.

Part Number	Description	Compatible Tubes
5220-4896	SampleArray Base Unit compatible with 48- and 96-format Thermo Scientific tubes	Nunc Universal 1.8 mL Externally-threaded ScrewTop Tubes in Latch Rack
5220-4896WM	SampleArray Base Unit with pre-installed Weight Module, compatible with 48- and 96-format Thermo Scientific tubes	Nunc Cryobank 2.0 mL ScrewTop Tubes in Latch Rack Matrix 0.5 mL ScrewTop Tubes in Latch Rack Matrix 1.0 mL ScrewTop Tubes in Latch Rack
5221-WM4896	SampleArray Base Weigh Station Accessory compatible with 48- and 96-format Thermo Scientific tubes	Matrix 0.5 mL Septum or Foil-sealed Tubes in Latch Rack Matrix 0.5 mL Tubes in Latch Rack with DuraSeal Matrix 0.75 mL Septum Tubes or Foil-sealed Tubes in Latch Rack Matrix 0.75 mL Septum Tubes with DuraSeal in Latch Rack Matrix 1.4 mL Septum or Foil-sealed Tubes in Latch Rack (V, round, flat bottom) Matrix 1.4 mL Tubes in Latch Rack with DuraSeal
5220-384	SampleArray Base Unit compatible with 384-format Thermo Scientific tubes	Matrix 0.1 mL 384 Tubes in Latch Rack Foil Sealed
5220-384WM	SampleArray Base Unit with pre-installed Weight Module, compatible with 384-format Thermo Scientific tubes	
5221-WM384	SampleArray Base Weigh Station Accessory compatible with 384-format Thermo Scientific tubes	

2.2 Overview

The SampleArray tube handler is available in two versions depending on the tube type being used:

- 48/96 Version – for processing -48 and -96 format Thermo Scientific™ Matrix™, Nunc™, and Universal storage tubes
- 384 Version – for processing -384 format Matrix storage tubes

Both versions can be configured for use at ambient (room temperature) and at -20°C for use in a frost-free laboratory freezer.

The SampleArray unit includes a 2D barcode reader as a standard component to verify tube barcodes being moved between rack locations. There is also a weigh scale option available for both SampleArray versions which enables individual tube weighing. The weigh scale module accessory is available pre-installed or as an add on accessory. The weigh scale module can be used at temperatures above +10°C only.

Each version has the same basic configuration of a moving gantry with a gripper to pick up, move and place the tubes.

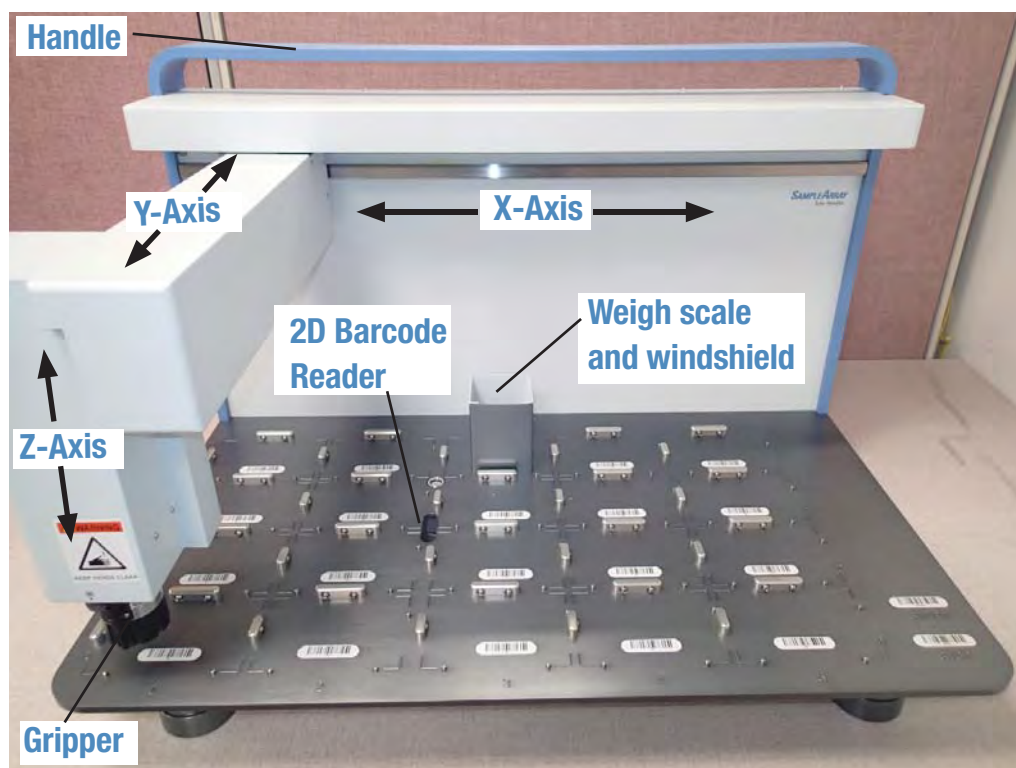


Figure 1: 48/96 Version

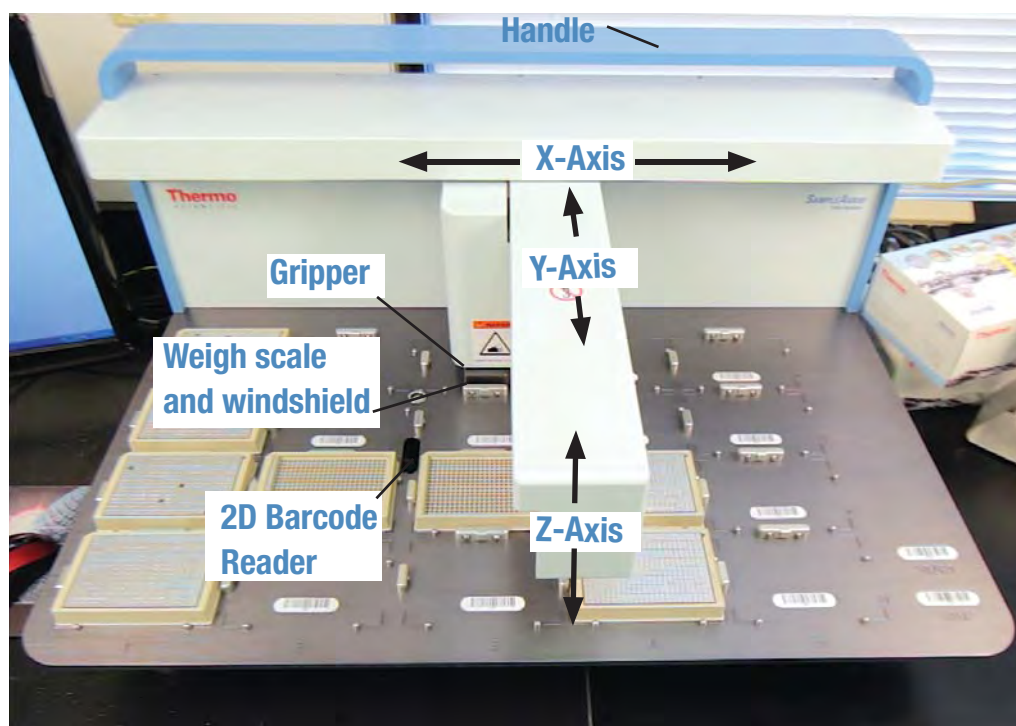


Figure 2: 384 Version

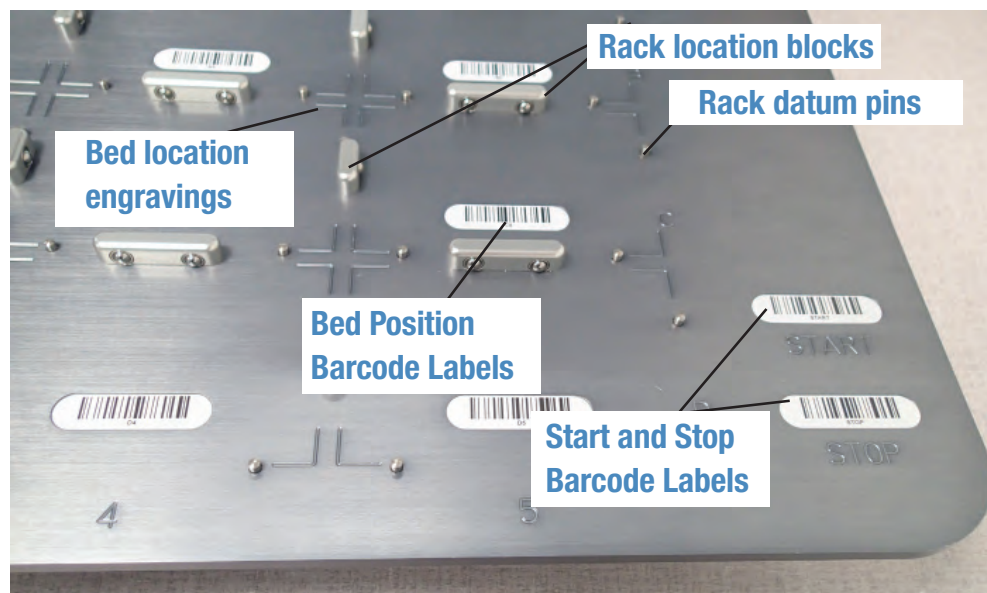


Figure 3: Bed Details

The SampleArray bed has specially designed features to locate the tube racks. There are also engraving marks to assist in correct rack positioning.

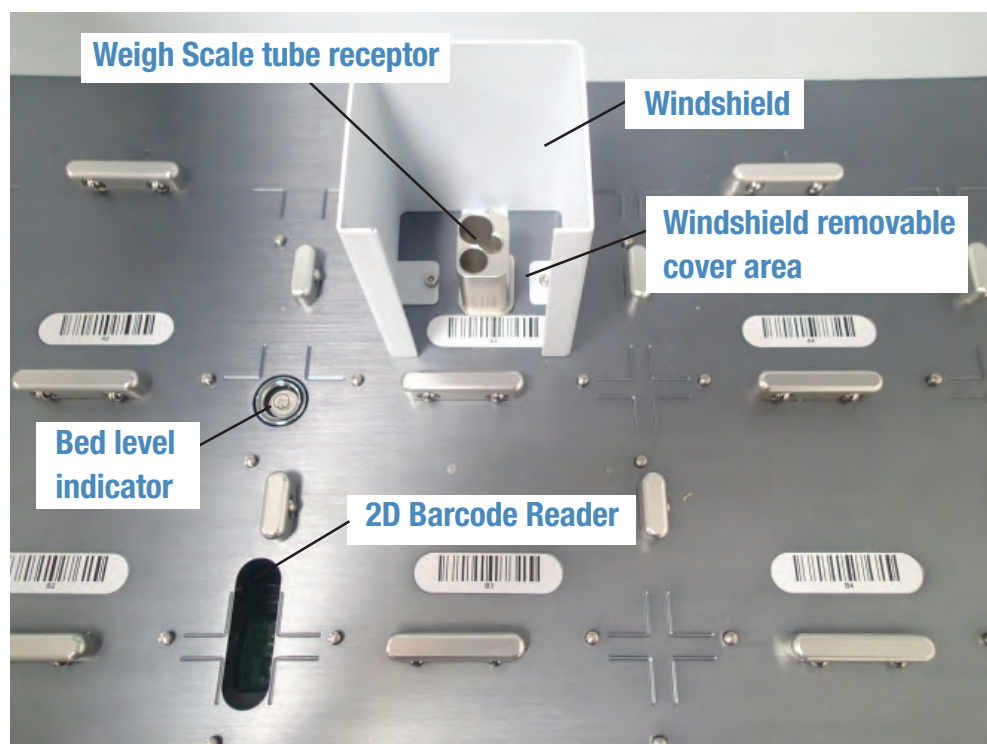


Figure 4: Weigh Scale Layout - 48/96 Version

With the weighing option there is a receptor for the tube to be placed into and a specially designed windshield. The front section of the windshield is held in position using magnets so it can be easily removed to aid access to the receptor.

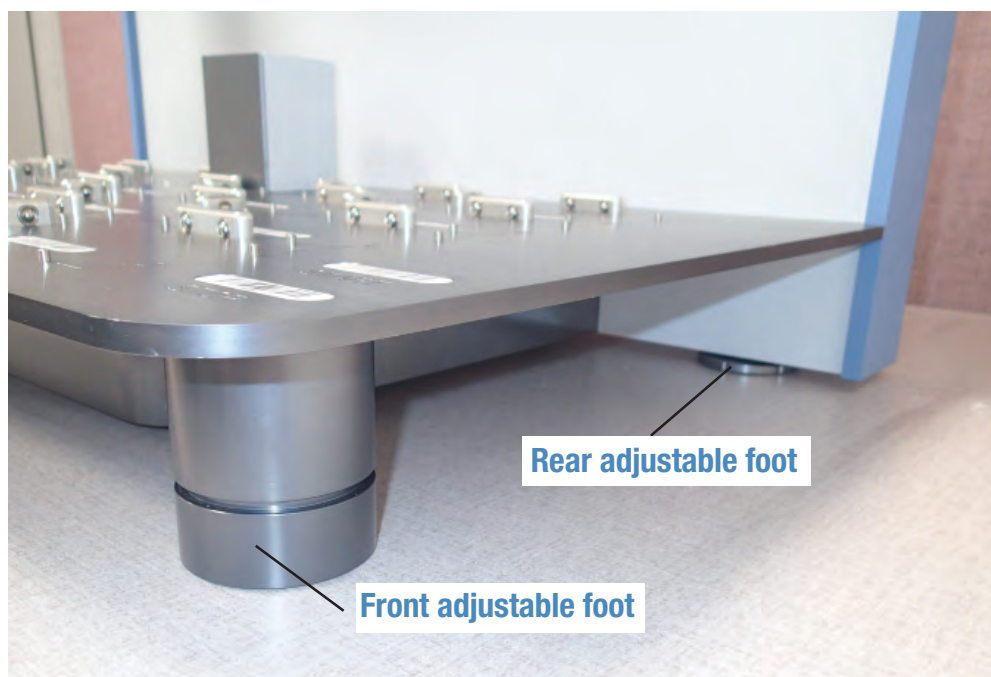


Figure 5: Feet Adjusters

For correct function of the weighing option the bed must be level. This can be achieved by use of the four adjustable feet and the level indicator/



Figure 6: On/Off Switch with Power and USB Connectors

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Chapter 3 - Unpacking and Installation

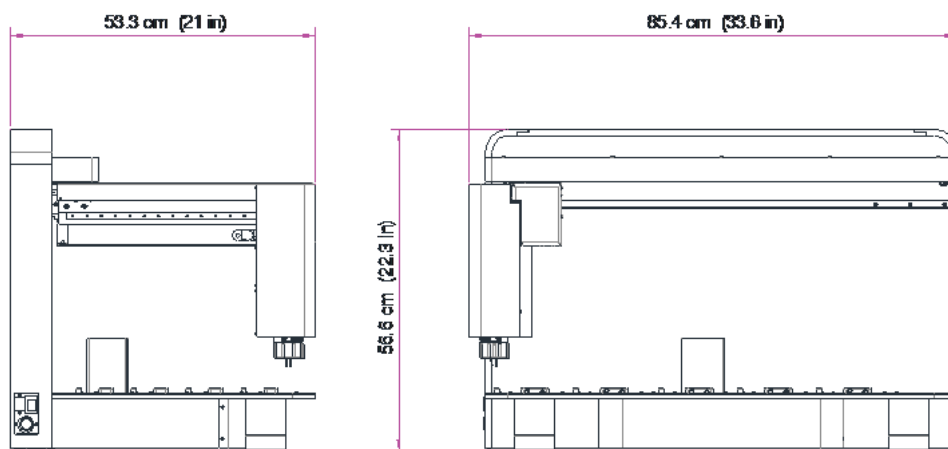
3.1 Unpacking the SampleArray Tube Handler

WARNING! The weight of the SampleArray unit is approximately 41kg (90 lb). Ensure that the instrument is handled safely by at least two people and that appropriate lifting methods are employed. Always lift the unit using the underside of the bed and the rail above the back plate. Never lift the SampleArray unit by any of the axes. Failure to follow this instruction may cause damage to the axes and result in malfunction of the machine.

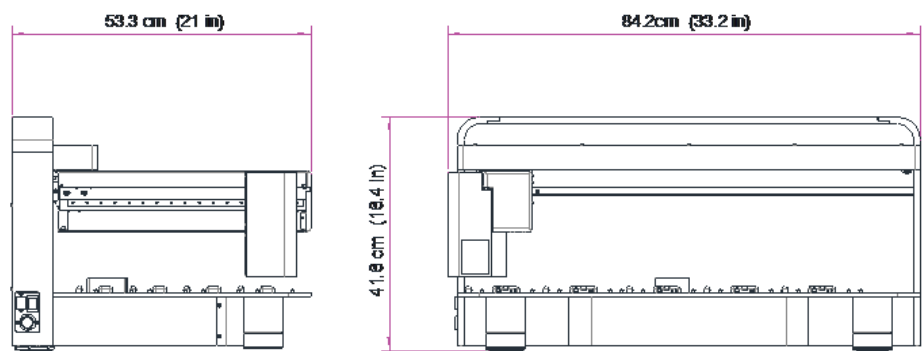
Check that all laboratory benches, safety cabinets, and other equipment are capable of safely supporting the weight of the unit.

3.2 Installing the SampleArray Tube Handler

The SampleArray Tube Handler is designed for laboratory use. Dimensions are given below:



48/96 Version



384 Version

The instrument should be installed on a flat and stable surface in close proximity to electricity.

NOTE: If the instrument is to be used in a freezer ensure it can be lifted in and out safely with sufficient space for hands. Ensure that the ON/OFF switch can be accessed and there is room for the power and USB cables.

3.3 Operating Conditions

Room Temperature

Operating Temperature	15°C to 30°C
Humidity	<75% RH non condensing

-20°C

Operating Temperature	nominal -20°C
Humidity	frost free

Note: The weigh scale option is not suitable for operation below +10°C.

3.4 Power

The SampleArray unit is a 24V DC device and supplied with an external AC adaptor. Connection is via the switched DC inlet at the left hand side of the instrument (see Figure 6: On / Off Switch with Power and USB Connector).

Voltage	Frequency
85 to 264V AC	47 to 63 Hz

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Chapter 4 - Software Installation

4.1 System requirements

Supported Operating System:

- Windows® XP SP3
- Windows 7
- Windows 8.1

Supported Architectures:

- x86
- x64

Hardware Requirements:

- 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor
- 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit)
- 1 USB 2 or USB 1 port

Minimum disk space:

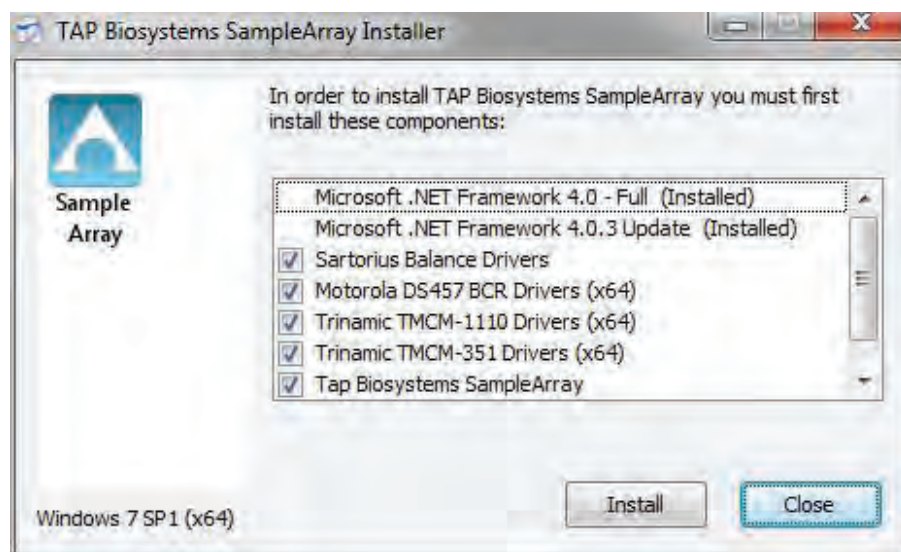
- 4 gigabyte (GB) minimum disk space

4.2 Using the installer

Install the SampleArray Tube Handler software before connecting the instrument.

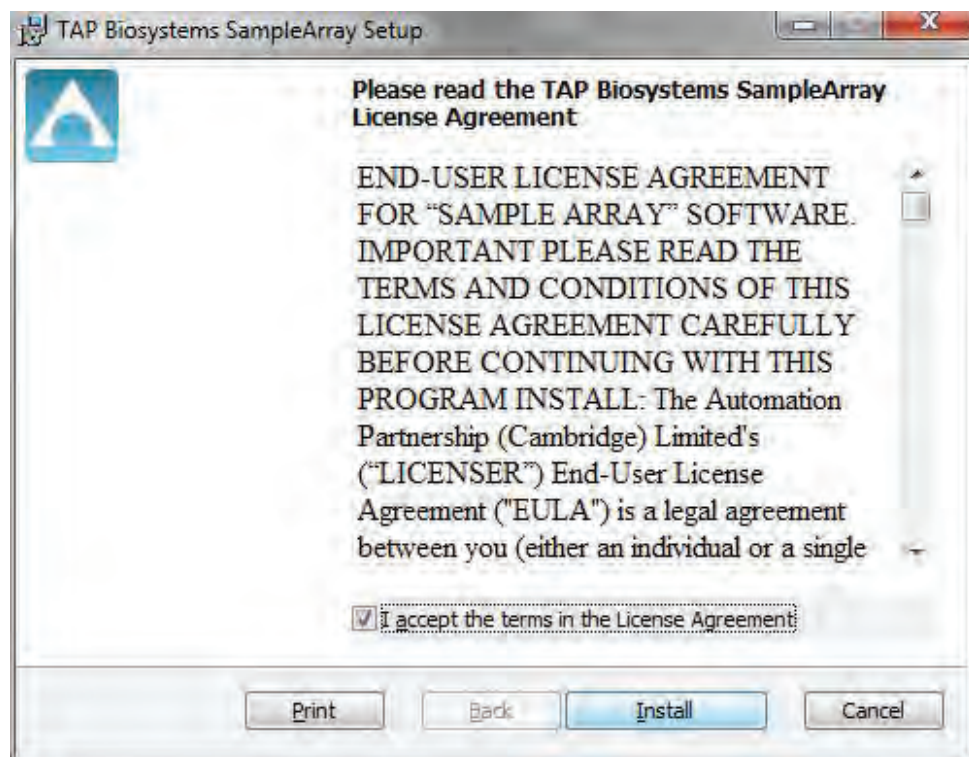
Double-click on the installer software "SampleArray_1.0.119.0_installer.exe" or higher. The instrument requires version 4.0.3 of the Dot Net Framework. This will be installed if not found. The installer will look for a directory called "SupportFiles\dotNet4.0" for the Dot Net Framework installer. If not found here, it will attempt to download it from Microsoft® website.

Click “Install” to start.

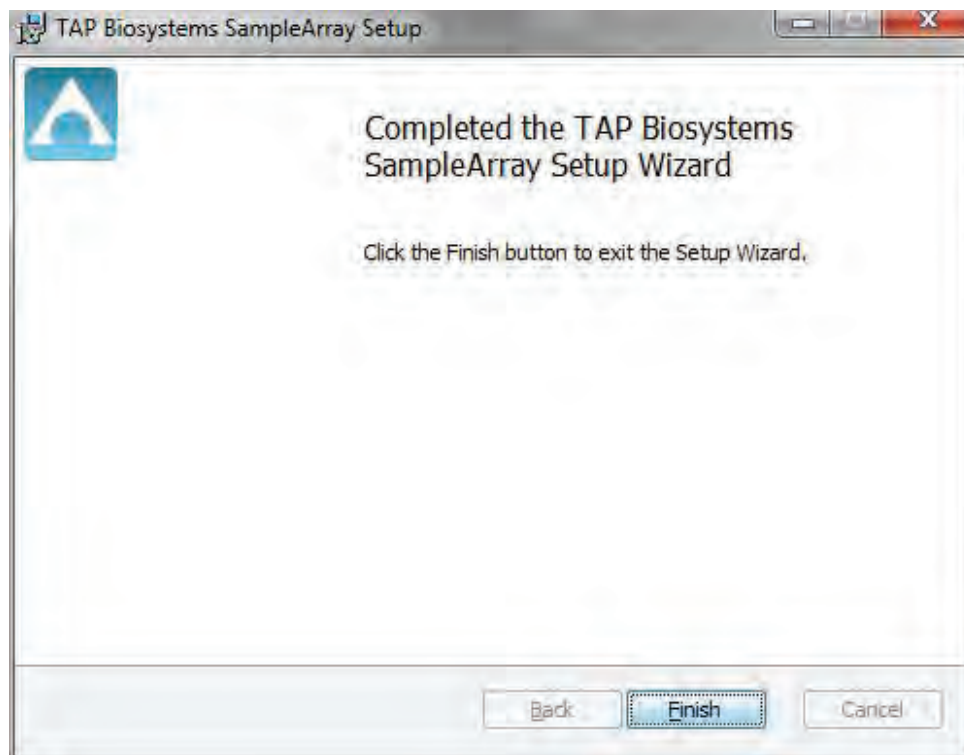


As components of the software are installed the installer will ask for confirmation. Follow the installation prompts.

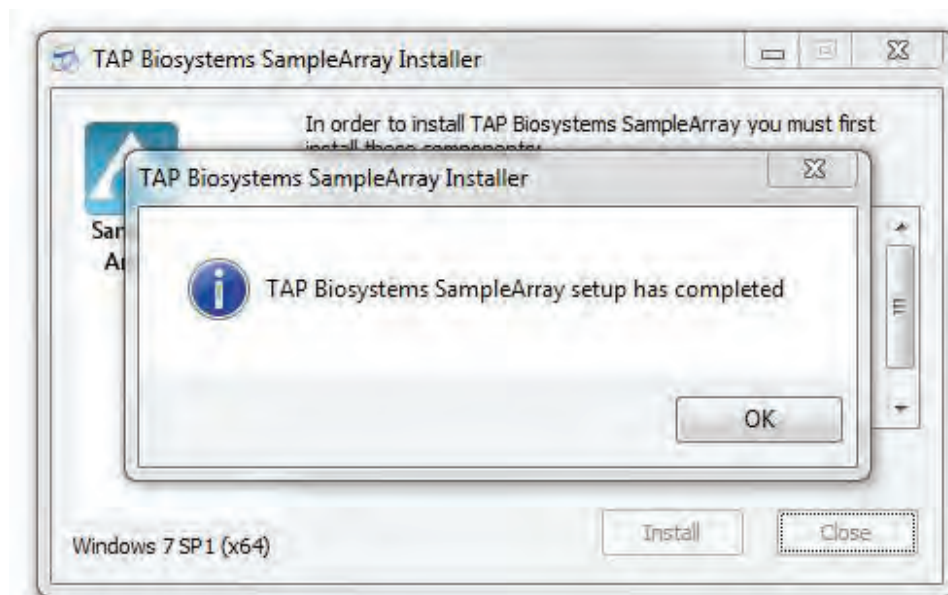
You will need to read and accept the License terms before proceeding.



Once the software has completed installation, click Finish.



Click OK and close the installer.



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Chapter 5 - Startup

5.1 Safety

The instrument contains moving parts that may cause injury. The SampleArray Tube Handler is designed to protect users from these hazards under normal operating conditions.

Do not attempt to access the interior of the device through any openings and do not remove panels – there are no user serviceable components inside. Failure to comply may result in serious injury.

In an emergency; turn off the SampleArray unit. The on/off switch is located at the left hand side of the instrument. Or alternatively, unplug the unit.

5.2 Power up

If this is the first time that the instrument has been connected to the computer, expect to see several confirmation dialogs appear as the various device drivers are installed. Confirm any driver installation dialogs by choosing the default options.

Depending on your operating system, a message like the following may be displayed whenever the unit is connected – this happens when the internal memory stick is detected. Select “Continue without scanning”, or simply close the box.

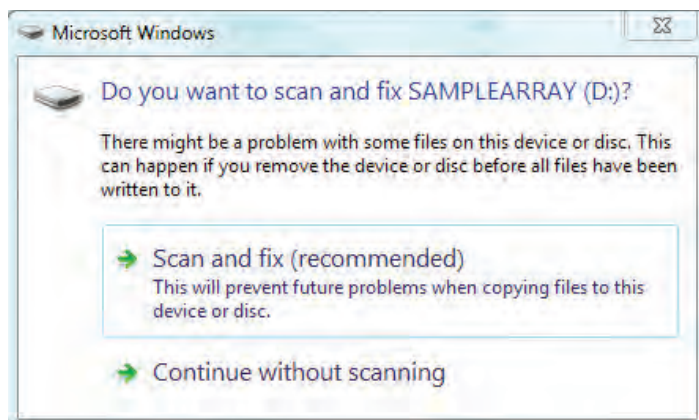


Figure 7: Memory stick prompt

Similarly, you may see a message like the following. Always close the box.

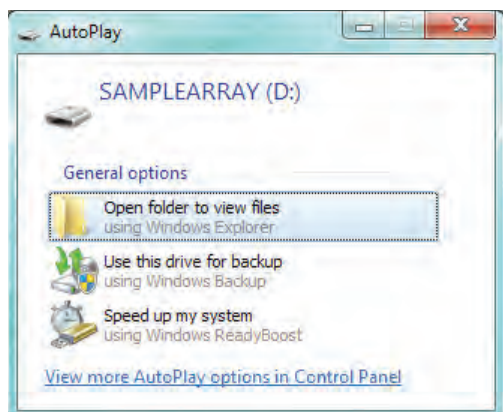


Figure 8: Memory stick prompt

WARNING Selecting other options may prevent the instrument from being used.

5.3 Connecting to Instrument

(The USB port on the computer has to be USB 1.0 or USB 2.0 version as the unit will not work correctly with USB 3.0 communication.)

Once the SampleArray software is started, it will begin searching for hardware and will display the following screen:

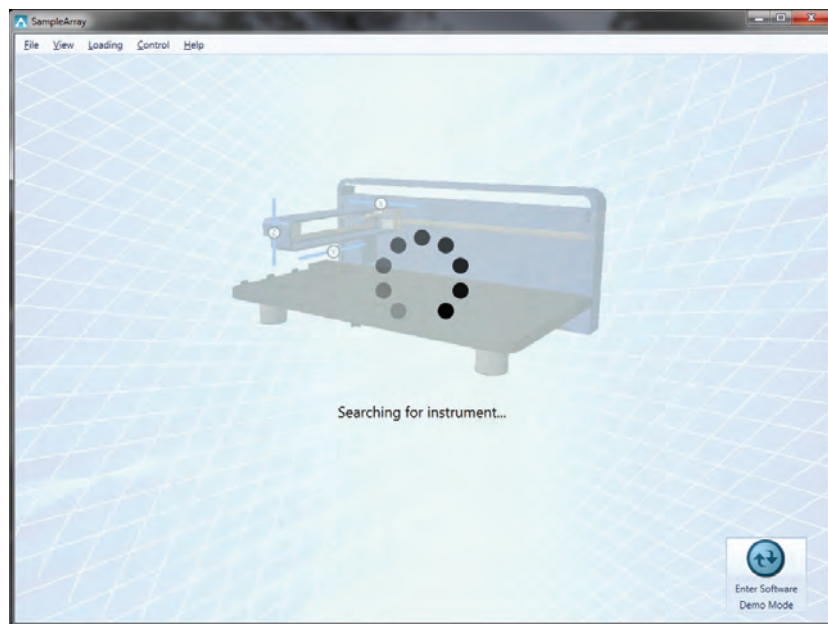


Figure 9: Searching for instrument

Having located the hardware, the software will display the status panel and will begin to connect to the individual instrument devices.

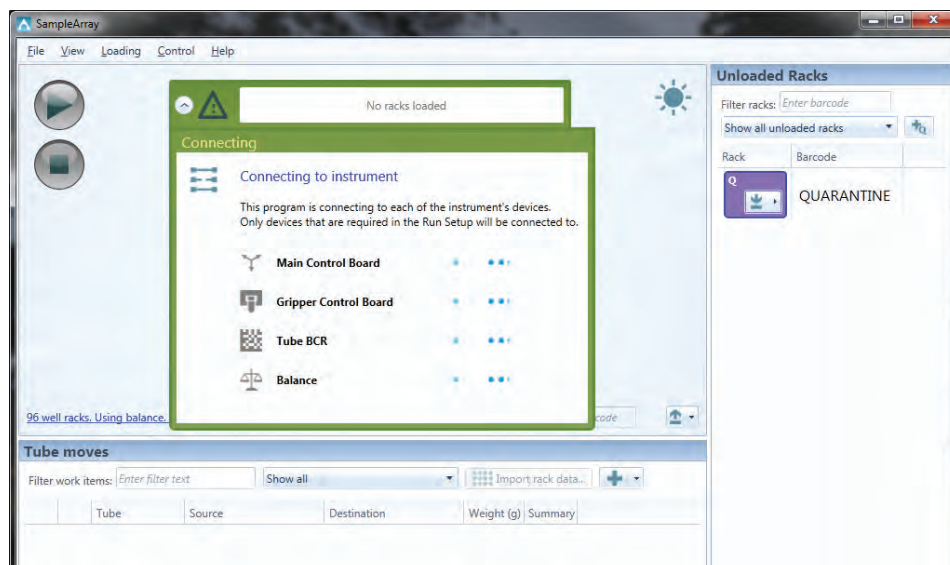


Figure 10 : Connecting to instrument

Once the software has connected to the individual instrument devices, the empty instrument bed mimic is displayed and the SampleArray software is ready to start defining tube moves.

If the software fails to find all the devices, refer to Section 8.1 for trouble-shooting options.

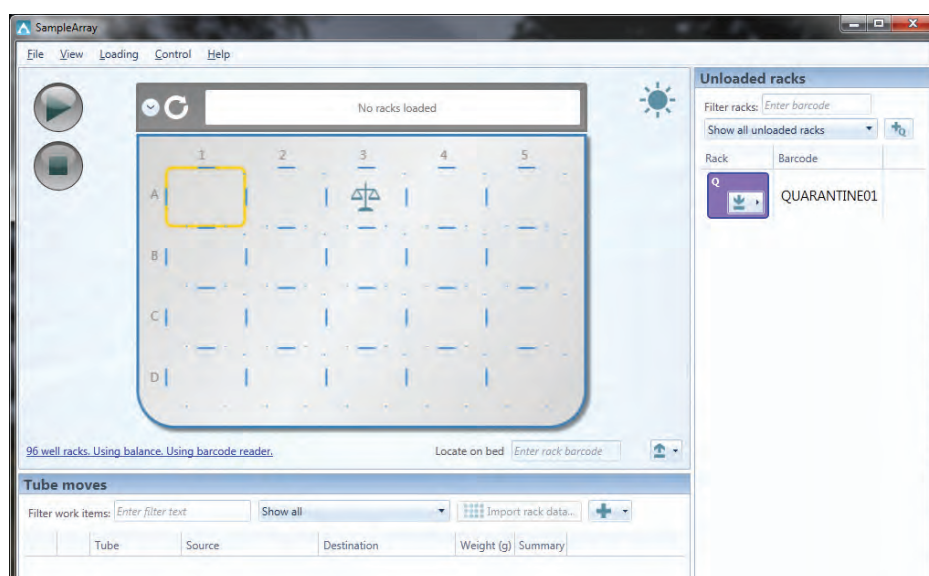


Figure 11 : Instrument connected.

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Chapter 6 - Operation

6.1 Defining the Run Setup Configuration

The Run Setup Configuration is the collection of settings that define how the SampleArray unit will operate when running. The configuration is stored in a file which may be loaded from an external database system, or edited directly using the Run Setup option.

Opening a Run setup configuration

To open a Run setup configuration, click on “Run setup configuration...” in the View menu. This will open the most recently used configuration or the default settings if this is the first use of the SampleArray system.

To use a different configuration, select the “Open...” button on the Run setup screen and choose the desired configuration from the previously saved versions.

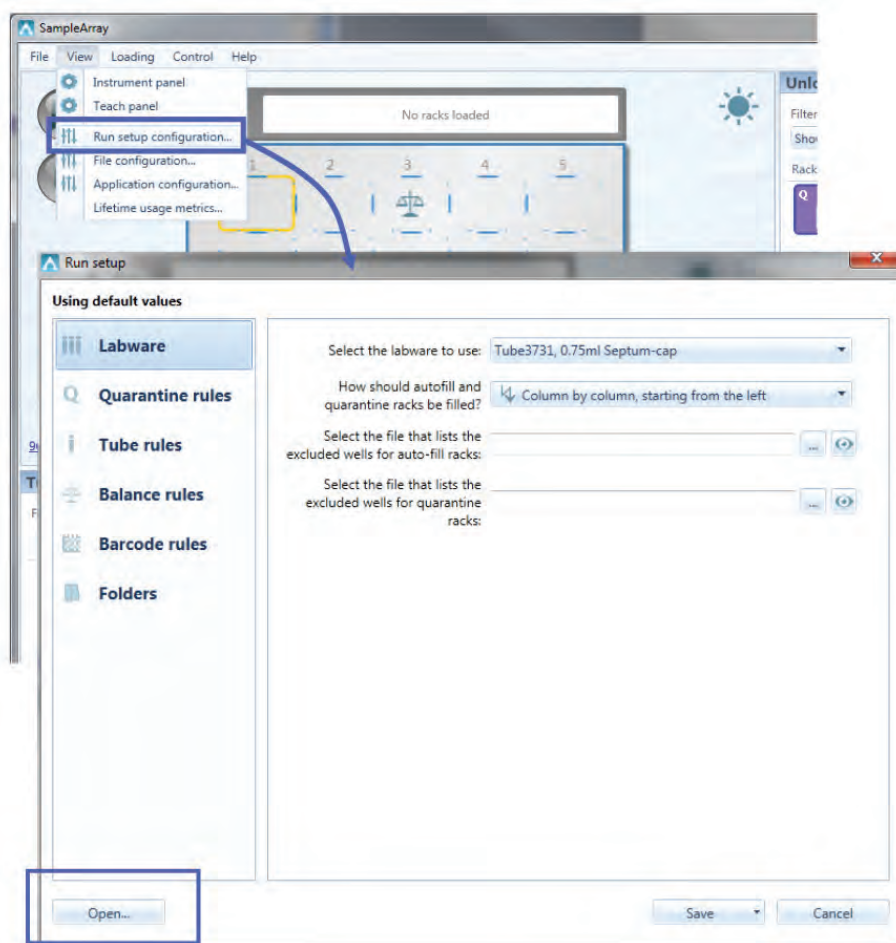


Figure 12 : Selecting Run setup configuration

After running the configuration program, various system parameters will be available (detailed in the following sections). Required settings will vary according to the system configuration. Not all settings will be required.

Selecting Labware Type

The 384 model is compatible with Matrix 0.1 mL 384 Tubes in Latch Rack only.

For the 48/96 SampleArray model, the type of tubes being used needs to be specified:

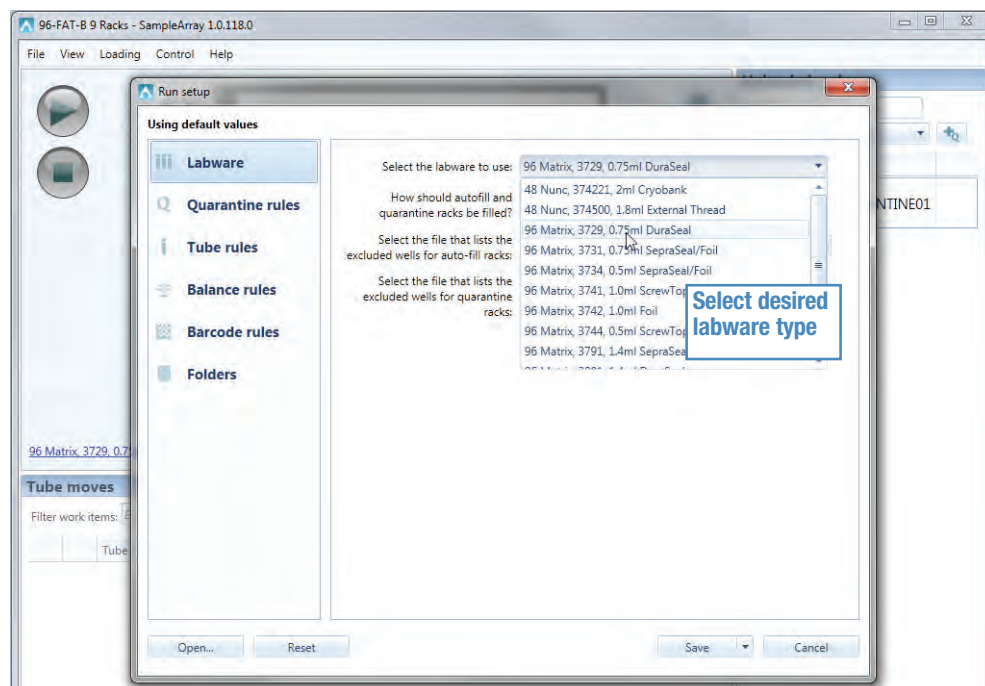


Figure 13 : Selecting labware type

The 48/96 model is compatible with a range of 48 and 96 format tubes including:

48 Format Internal and External Threaded Screw Top Tubes
Universal 1.8ml Externally Threaded Screw Top Tubes in Latch Rack
Nunc 2.0 ml Cryobank Screw Top Tubes in Latch Rack
96 Format Internal Threaded Screw Top Tubes
Matrix 0.5 ml Screw Top Tubes in Latch Rack
Matrix 1.0 ml Screw Top Tubes in Latch Rack
96 Format Septa or Duraseal Capped or Individually Foil Sealed Tubes
Matrix 0.5 ml Septum or Foil Sealed Tubes in Latch Rack
Matrix 0.5 ml Tubes in Latch Rack w/ DuraSeal
Matrix 0.75 ml Septum or Foil Sealed Tubes in Latch Rack
Matrix 0.75 ml Septum Tubes w/ DuraSeal in Latch Rack
Matrix 1.4 ml Septum or Foil Sealed Tubes in Latch Rack (V, round, flat bottom)
Matrix 1.4 ml Tubes in Latch Rack w/ DuraSeal

A full list of compatible tubes can be found in the Appendix.

Note: Use of labeled tubes may result in picking failures within racks or at the balance.

WARNING The selected labware type must match the type of labware actually loaded.

Selecting Rack Filling sequence

Autofill and quarantine racks can be filled by column or by row, starting from left or right, or from top or bottom

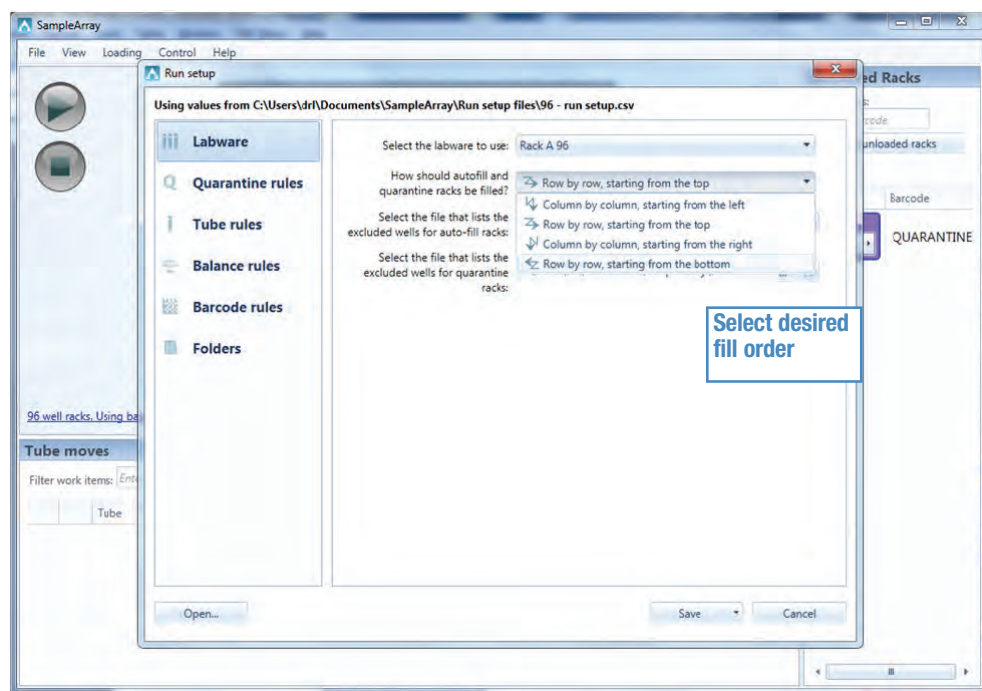


Figure 14 : Selecting quarantine rack fill order

It is possible to specify that some tube locations within Autofill and quarantine racks will be excluded i.e. not used. This can be useful, for example, if the rack is to be used to create a plate with control wells, or if it is already populated with tubes (see also Section 6.2.4 on importing rack data). These locations can be defined from a file or using the 'view' icon.

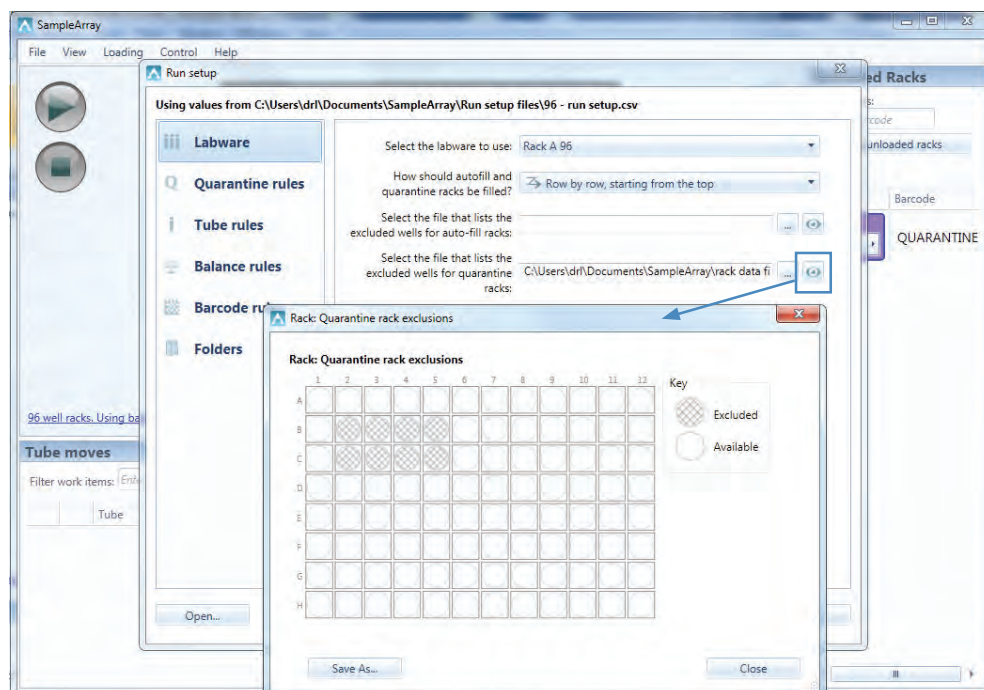


Figure 15: Viewing an exclusion template

After selecting the view icon, the desired tube locations to be excluded can be selected by left clicking. If an excluded location is selected, it will revert to being available.

After identifying the relevant locations, the file can be saved by selecting **Save As....**

Note: If **Close** is selected without saving the file, no changes will be retained.

Quarantine rules

It is possible to define the number of consecutive moves to quarantine, after which the SampleArray unit will automatically stop. This can be useful, for example, if a rack has been incorrectly loaded onto the instrument so the 2D tube barcodes do not match what is expected.

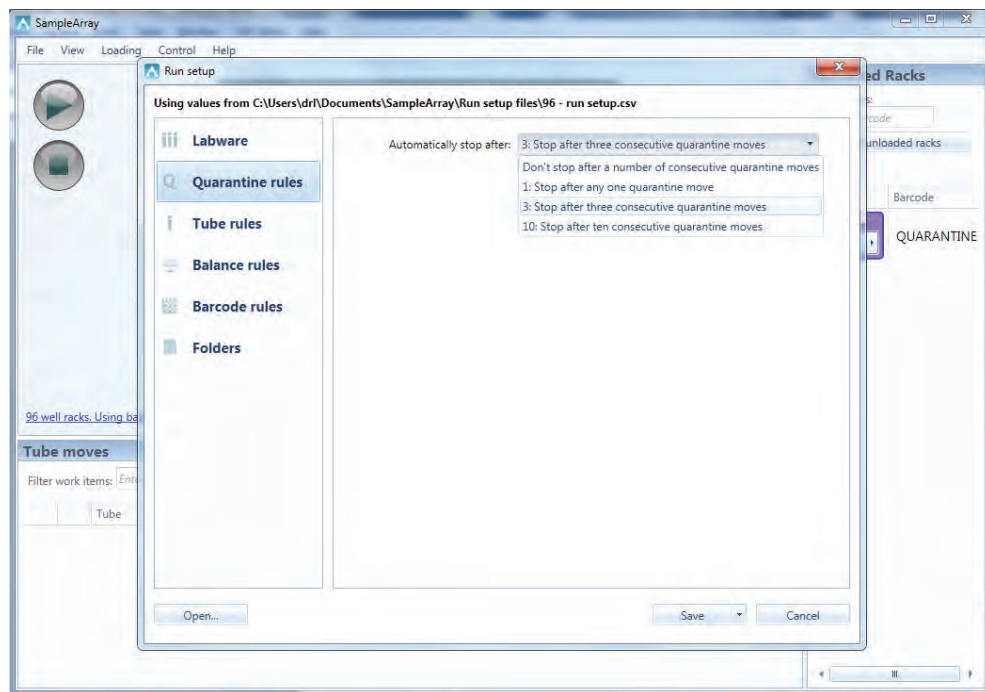


Figure 16 : Quarantine rules

Tube rules

This defines the required action if a tube is not found in a source location.

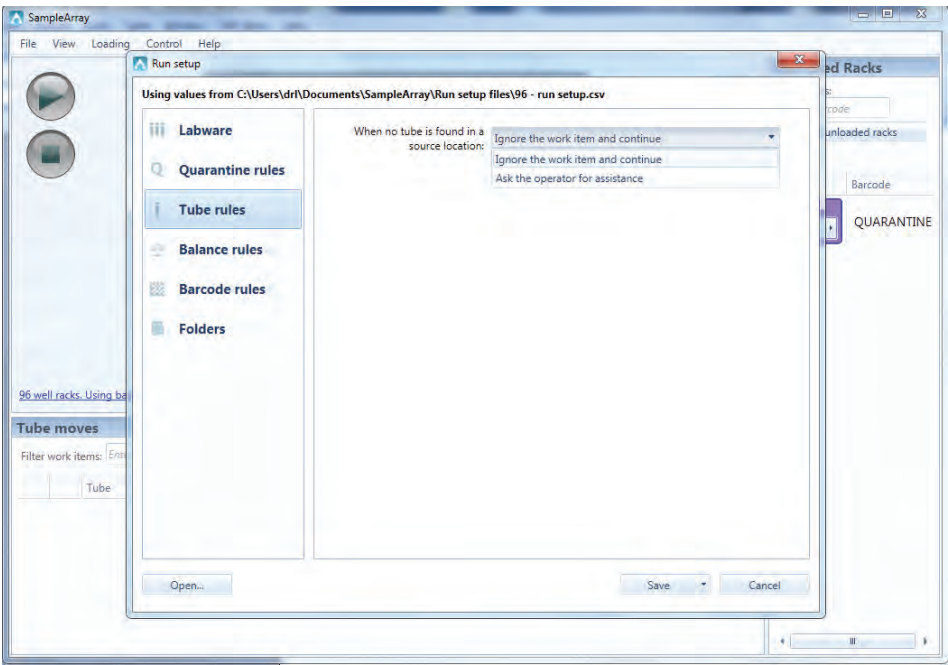


Figure 17 : Tube rules

Balance rules

This screen defines a range of actions related to the balance.

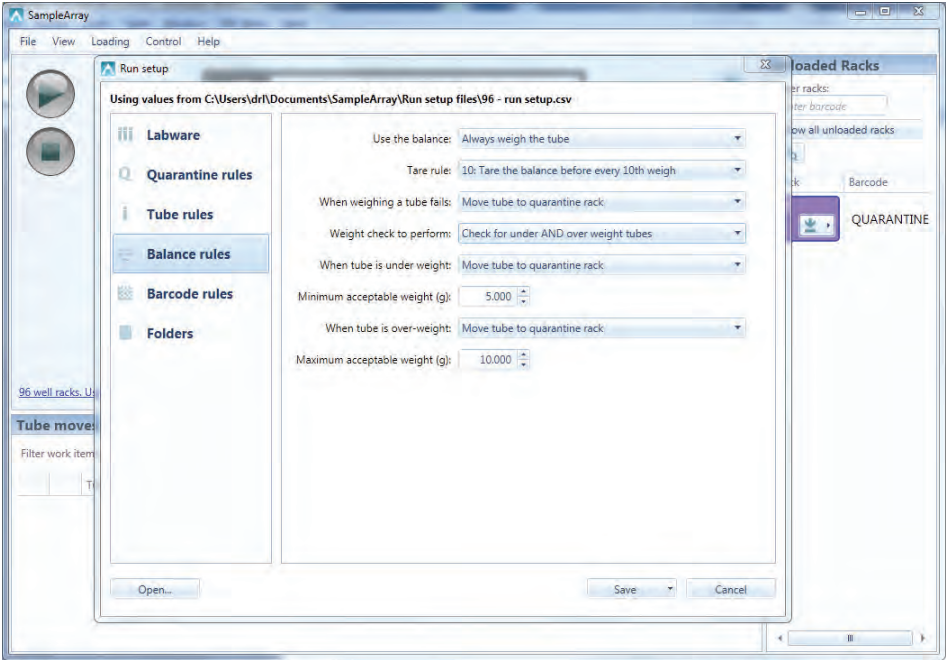


Figure 18 : Defining balance rules

If the option to **Always weigh the tube** is selected, the balance will be used when running through the work list. The other options on the screen will also become available.

The **Tare rule:** option allows the frequency of taring the balance to be selected – ranging from once at the start of the work list, to every single, 10th, 20th or 50th weighing of a tube.

The **When weighing a tube fails:** option allows four possible actions if the balance is unable to determine the tube weight.

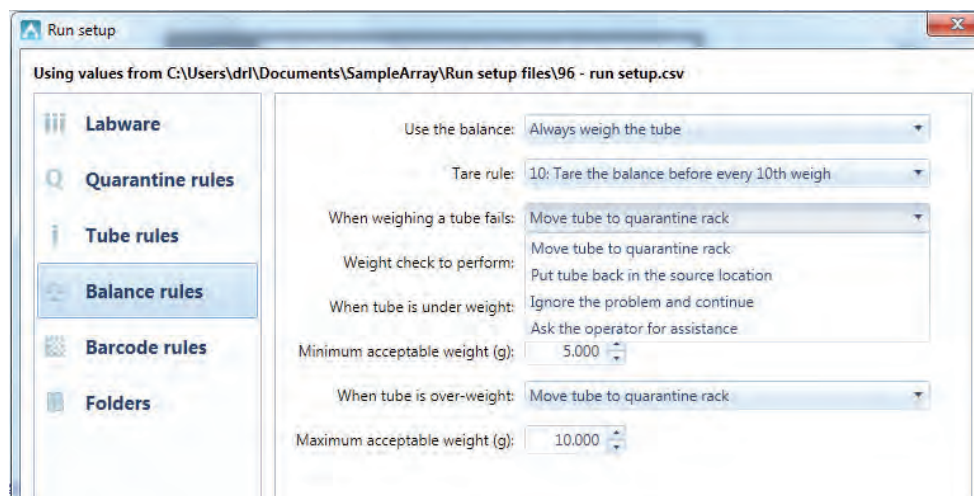


Figure 19 : Defining balance rules - failure actions.

The **Weight check to perform:** option allows the measured weight to be checked against the minimum and/or maximum acceptable weights, or not to be checked. This allows the SampleArray unit to be used to filter the set of tubes which are picked, to ensure that they have suitable volume for the down-stream process.

The Minimum and Maximum acceptable weights can be set between 0 – 999 mg

If the tube is under or over-weight, the same four actions are available as when weighing a tube fails.

Barcode rules

This screen allows a range of actions related to the 2D barcode reader to be defined.

If the option Always read the tube barcode is selected, the barcode reader will be used when running through the work list. The other options on the screen will also become available.

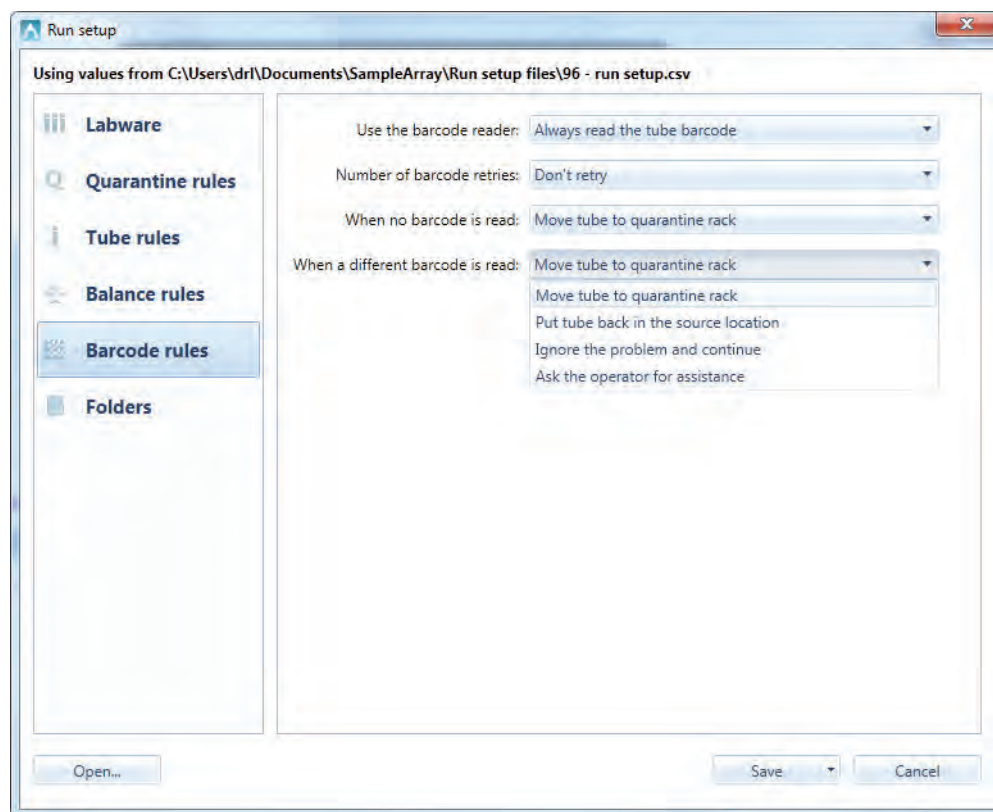


Figure 20 : Defining barcode rules.

If the barcode read is unsuccessful, the **Number of barcode retries** option allows the reader to attempt 1 or 3 retries, or to not retry.

If no barcode or an unexpected barcode is read, the four options are available as for invalid tube weights.

Folders

This screen specifies whether or not to record all tube moves in a log file, and separately whether to record all tube moves involving the quarantine rack.

If the log files are enabled, as would normally be the case, the locations to store them are defined here. The locations can be set to a network drive to allow a database system to pick up the data. The computer should be connected to the same network at the designated drive.

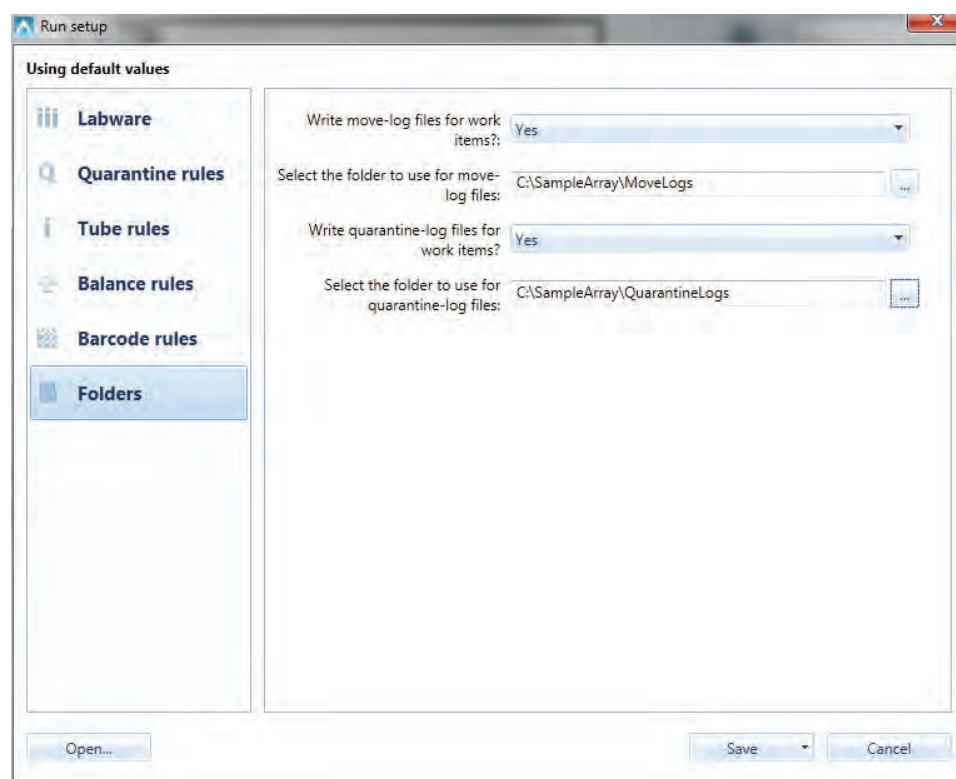


Figure 21: Defining run setup folders.

Saving the Run setup configuration

Having selected all the desired settings, it is necessary to save the configuration:

- To save the settings under the current configuration, select **Save**
- To save the settings to a new file, select **Save as...**
- **Cancel** will lose any changes that have been made.

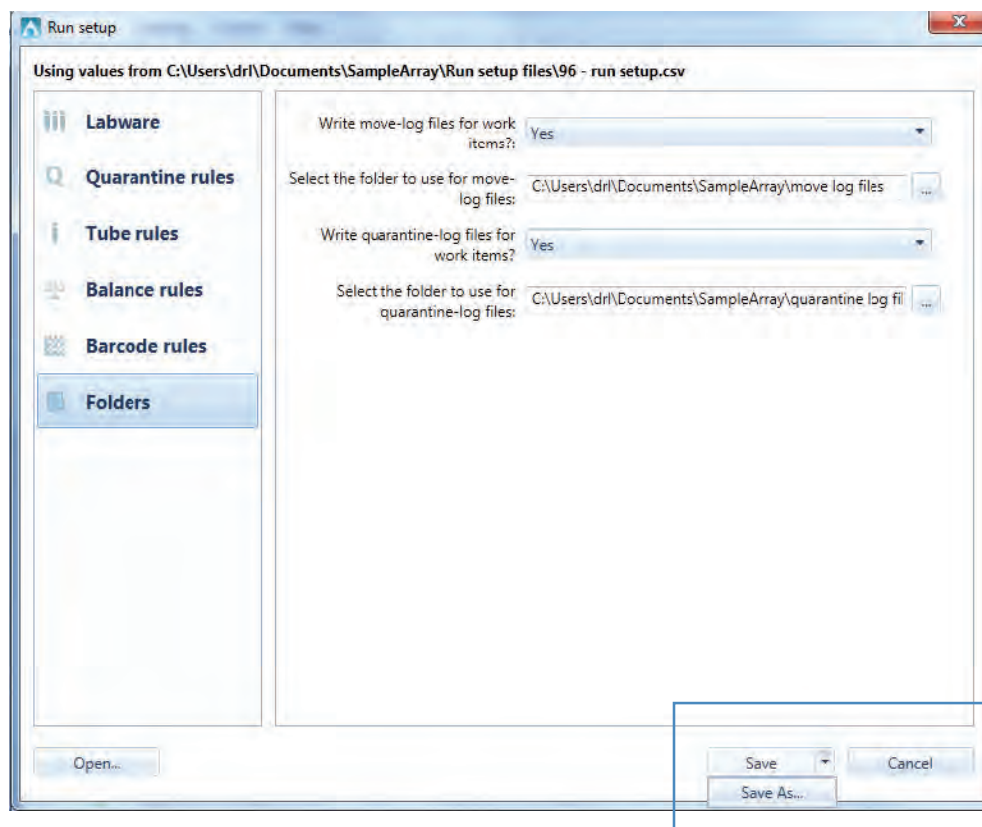


Figure 22 : Saving Run setup configuration.

6.2 Defining tube moves

A sequence of one or more defined tube moves is called a work list.

A work list can be generated automatically by a database or LIMS (Laboratory Information Management System), created ad-hoc by the user by defining individual tube moves from the user interface, or created from existing files. In all cases, the work list can then be modified and saved as required.

The destination of a move can be set to a specific well in a specific rack, or left blank. If left blank, the next free location in an auto-fill rack will be automatically selected at run time.

It is possible to use the same location as source and destination. This might be used to check the weight and/or barcode of a tube and then return it to its original location, or in conjunction with Balance rules to filter tubes by weight.

Creating a work list from an existing file

The **File** menu provides options to create work lists from existing files

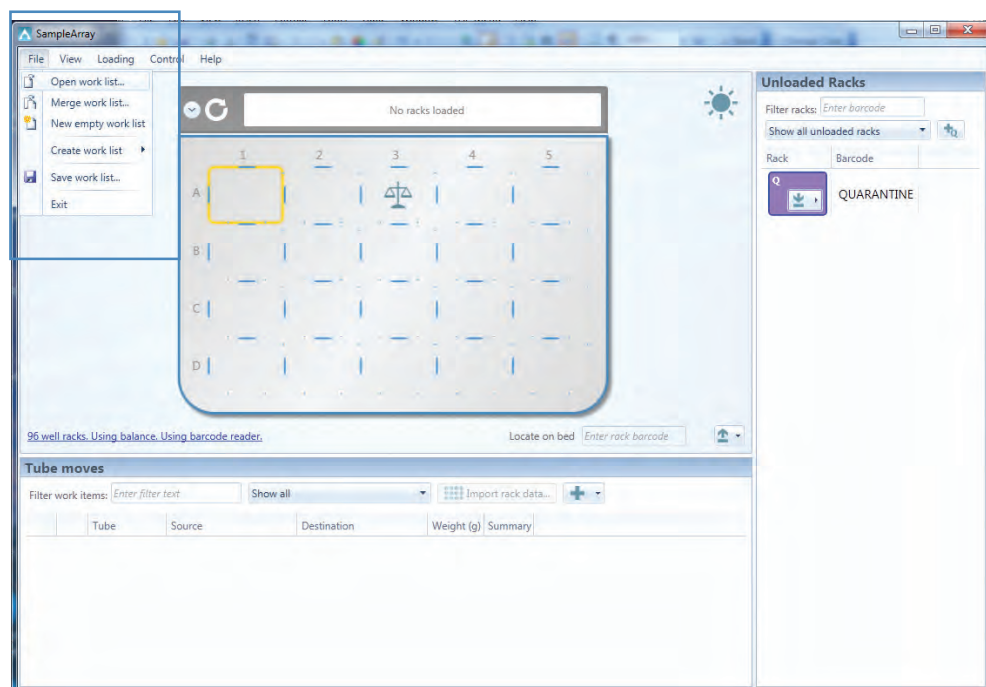


Figure 23 : Creating a work list

- **Open work list...** - imports an existing work list. This overwrites any currently defined tube moves.
- **Merge work list...** - imports an existing work list and combines it with any currently defined tube moves.
- **New empty work list...** - clears all existing tube moves.

There are also four options to create work lists based on previous move or quarantine logs

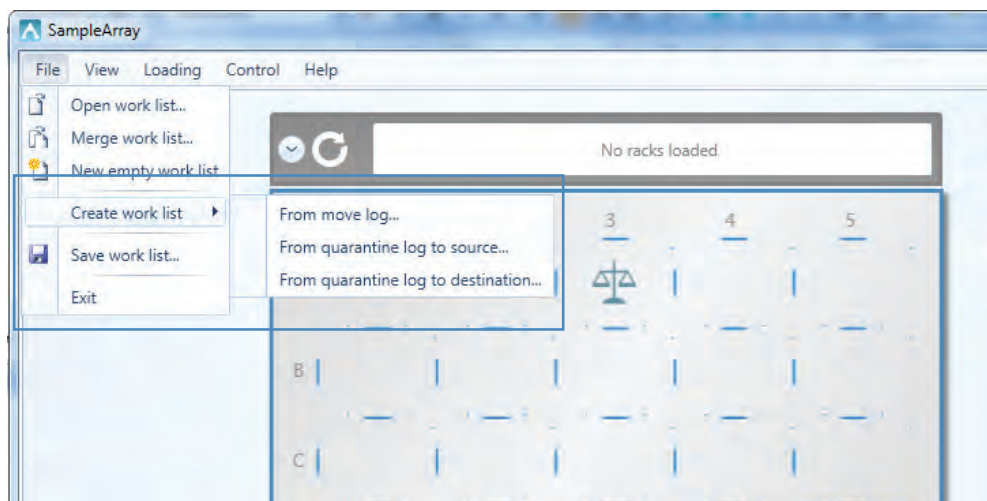


Figure 24 : Creating a work list from an existing file.

- **Create work list -> From move log...** - creates a work list to return all tubes from their destinations back to the original source locations
- **Create work list -> From quarantine log to source...** - creates a work list to move tubes that had been placed in the quarantine rack back to the original source locations
- **Create work list -> From quarantine log to destination...** - creates a work list to move tubes that had been placed in the quarantine rack to the original destination locations.
- **Create work list -> From rack data file...** - reads a rack data file (a list of tubes & tube positions) that has been written by a rack scanner for example. The format of the rack data file is defined in the File Configuration dialog.

Note: The menu entry **Generate rack of tube moves...** this will first prompt for a source rack and destination rack, and then will append a “rack full” of tube moves from source to destination. If the destination rack name is left blank, the moves will be created as auto-fill moves.

Viewing a work list

The items displayed from the work list can be filtered to those which match certain terms.

In the illustration below, the work list has been filtered to show only those moves containing a reference to 'DEST 3'

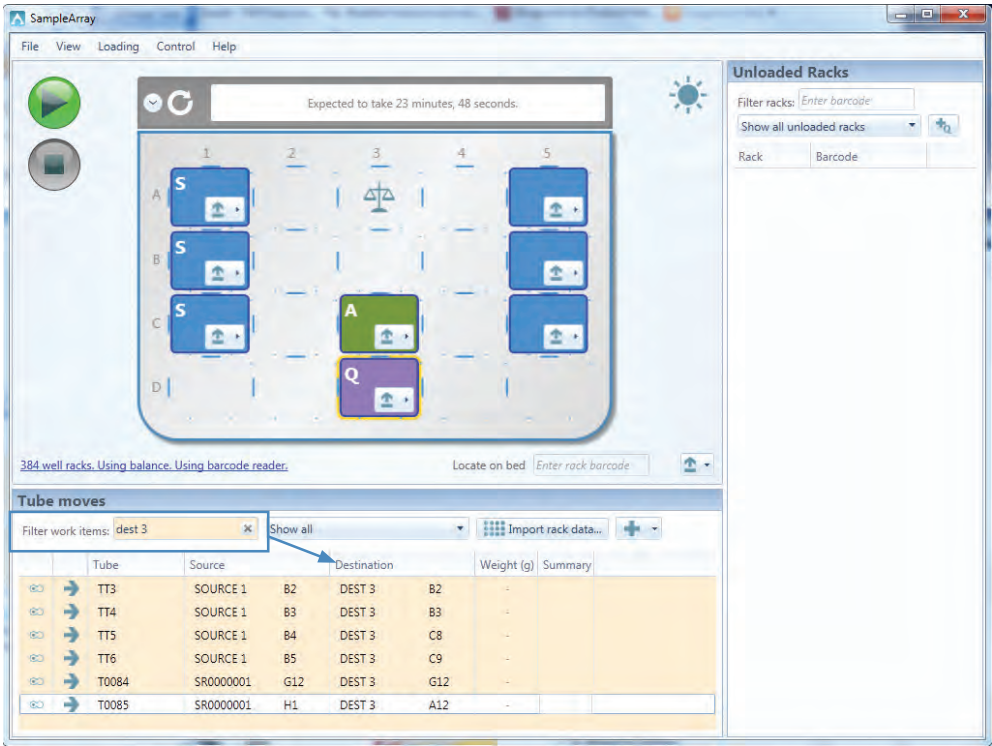


Figure 25 : Viewing a work list - filtering.

It is also possible to show specific categories of tube move, some of which only become relevant after a work list has been partially or completely executed.

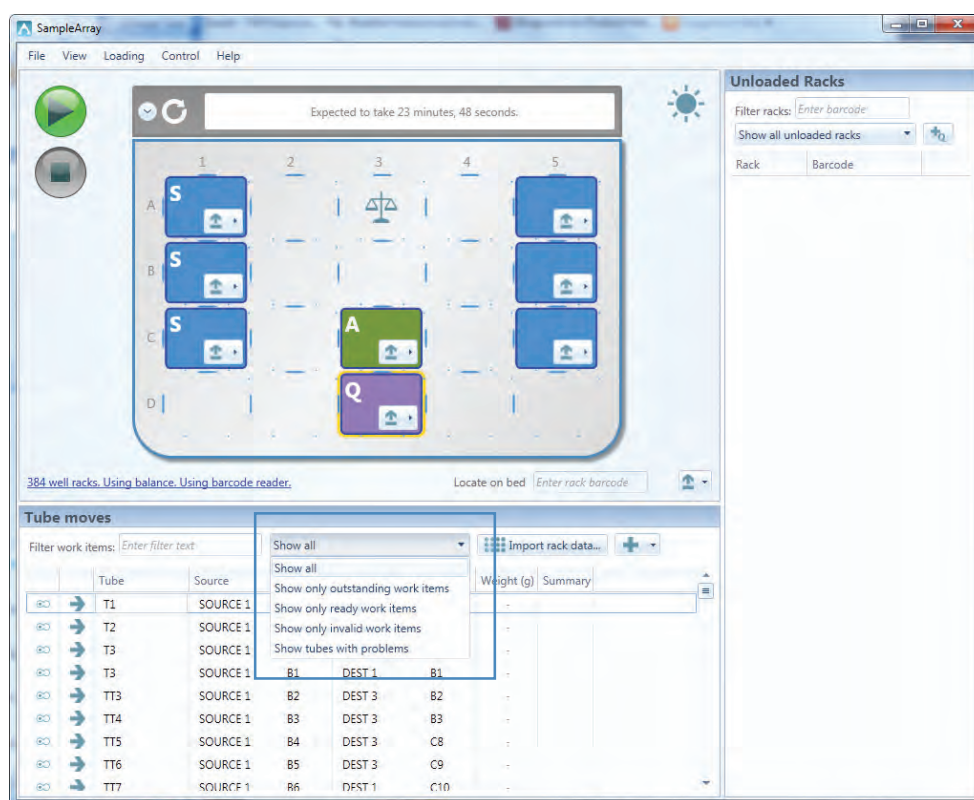


Figure 26 : Viewing a work list - by move category.

- **Show all** Shows all tube moves
- **Show only outstanding work items** shows tube moves that have not yet been completed.
- **Show only ready work items** shows tube moves for which both source and destination locations have been loaded onto the bed.
- **Show only invalid work items** shows tube moves with errors in the move definition (e.g. an invalid tube location)
- **Show tubes with problems** shows tube moves that have been attempted and either failed or completed with an error.

Editing a work list

Tube moves can be edited by left-clicking twice in the field requiring a change. This allows modifications to the individual attributes of a tube move

Right-clicking within a tube move row gives options relating to the whole line - **Add** a new row, **Delete** the selected row, **Cut**, **Copy** or **Paste**.

If the tube move has been completed, the **Delete**, **Cut** and **Reset** options will be unavailable. The **Reset** option will turn a completed move back to a new, un-started move.



Figure 27 : Editing a work list

The **Copy Summary** option copies a summary of the tube move to the clipboard, from where it can be pasted to the desired location. If the tube move has been completed, the summary will contain the completed actions and any barcode and balance information. If the tube move has not been completed, the summary will contain only the planned source and destination information.

The **Find** options give a graphical representation of where the source or destination locations are physically located in the system. Both the rack position on the bed, and the well location within the rack are indicated

In the illustration below, for the highlighted move, the source location is well G12 on rack SR0000001. Rack SR0000001 is shown as loaded in position A1 on the bed and well G12 is indicated on the display for the rack.

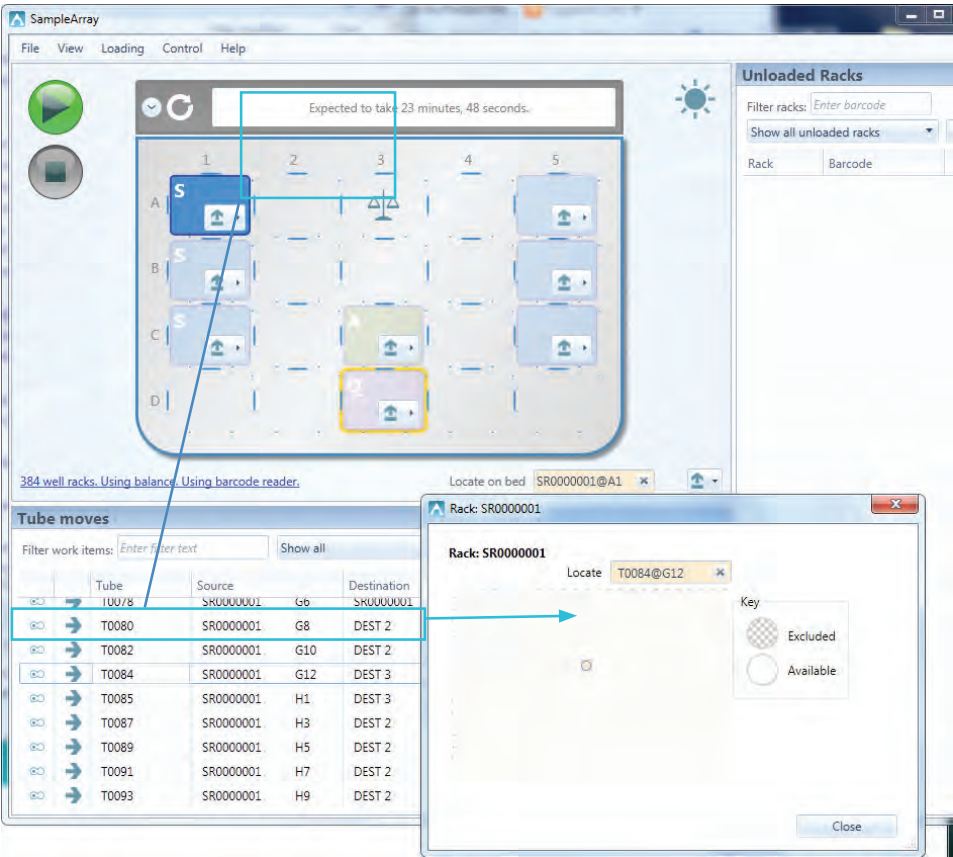


Figure 28 : Finding a rack / well location.

The same line item editing options are available via the **Add move** button.

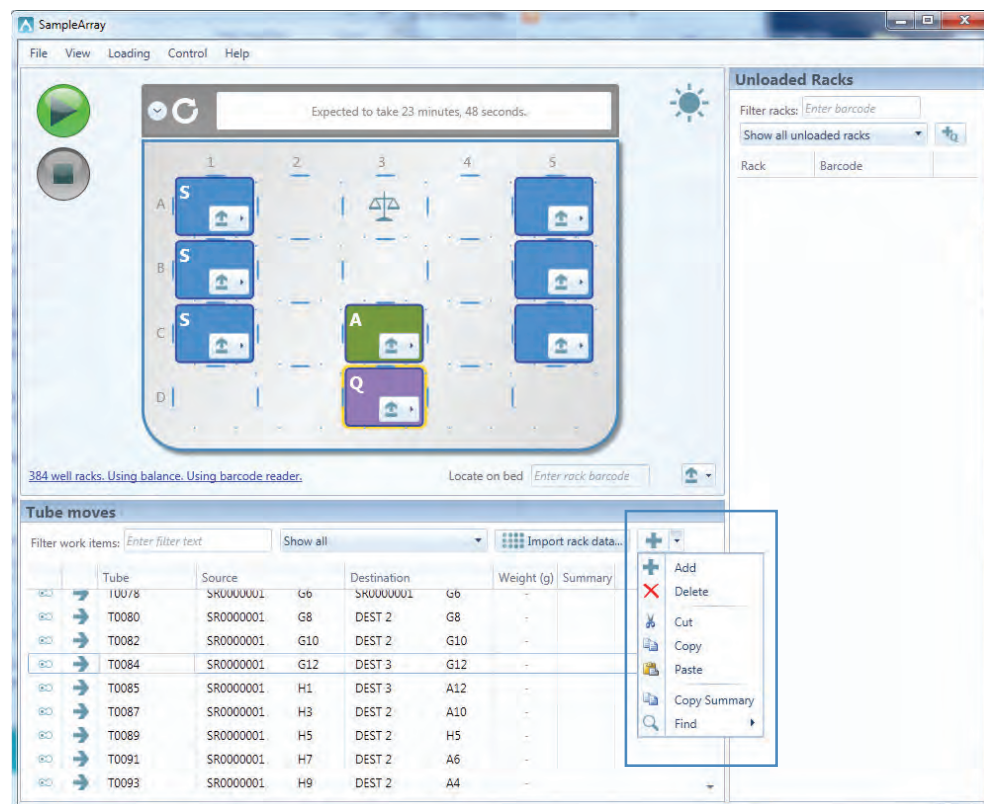


Figure 29 : Edit work list options via Add move button.

6.2.4 Importing rack data

In some cases there may be data available regarding the tubes that are currently loaded in a rack. The data file would contain the barcode and well of any tubes in the rack. This data can be imported and used to update the work list, or update the contents of Autofill and quarantine racks.

Rack data files will typically be created by a 2D rack barcode reader, such as the **Thermo Scientific™ VisionMate™** reader, which should be configured to specify the rack's barcode as the file name. This allows the instrument to recommend which rack the data should be associated with.

To import rack data, select the **Import rack data...** button, then select the file containing the data to be imported and the rack to which it should be applied.

If a source rack is selected, the data will be used to update the work list:

- If the work list has a barcode for a tube but not its source well, the source of the move will be updated from the location taken from the file
- If the work list has a move from a well, but no expected tube barcode, the barcode will be updated from the barcode taken from the file
- If the work list has both the Barcode and source well for a tube, the source well will be updated from the location taken from the file

A graphical representation of the rack will be shown, indicating the status of each well and the option to **Update work list** will become available.

If this is selected, and the tube information is not already defined as part of the work list, then the tube information will be imported from the rack data file.

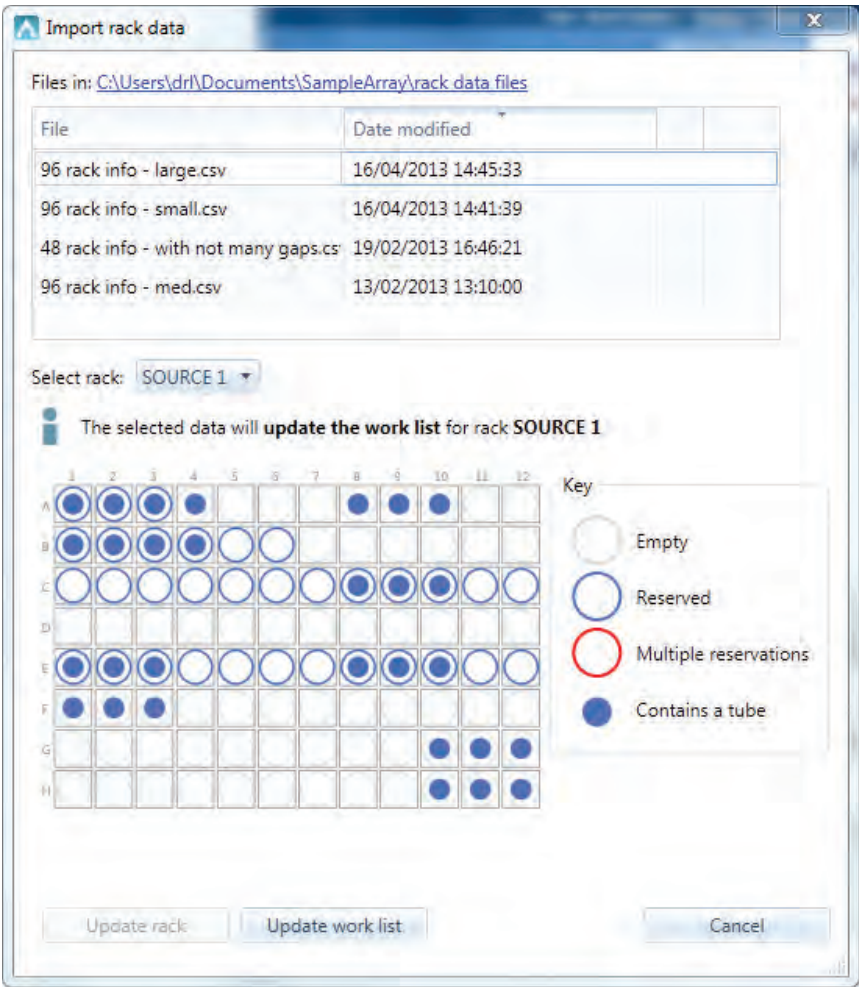


Figure 30 : Importing rack data.

If an Autofill or quarantine rack is selected, the data in the file is used to update the availability of wells in the rack. That is, any well that already contains a tube, according to the data file, will be marked as unavailable.

Saving the work list

To save the work list, select **Save work list...** from the **File** menu.

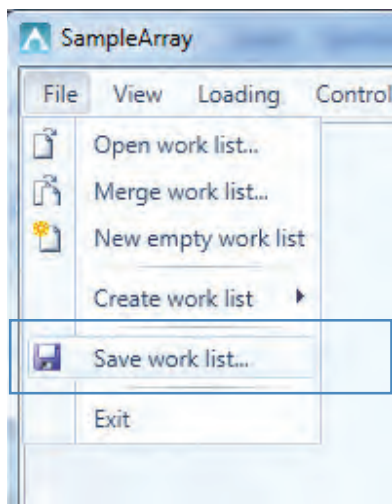


Figure 31 : File - Save work list.

6.3 Loading labware onto the bed

Once a valid tube move is defined, the required racks can be loaded onto the bed of the instrument.

The racks can be physically loaded in any vacant location on the bed of the instrument. The distance between source and destination racks (and the barcode reader and balance if used) will affect the throughput of the system. By way of an example, consider a case where there is one source rack, one destination rack, and barcode reading and weighing are being used. In this case, the best throughput can be achieved by placing the source rack near the barcode reader and the destination rack near the balance.

It is then necessary to update the software with the locations of the racks.

There are three ways to update the SampleArray software with the information about the loading (or unloading) of a rack:

- scanning the rack and rack location barcode
- clicking on load (or unload) in the rack menu
- drag-and-dropping the rack from the Unloaded Racks list onto the bed mimic (and vice versa)

Loading by scanning barcodes

Racks can be loaded just by barcodes. First, scan the barcode on the bed of the instrument where the rack will be loaded.



Figure 32 : Loading using barcodes – scanning location.

Then scan the barcode on the rack itself to load it into the selected bed location.



Figure 33 : Loading using barcodes – scanning rack

When the barcode matches a known rack barcode it will be loaded (and if it was already loaded it will be unloaded). If however, the barcode does not match a known barcode the first unloaded auto-fill rack will be loaded. The auto-fill rack will then be renamed to the scanned barcode. (If the rack is not intended as an Autofill rack, it can be renamed by clicking on the rack mimic).

The SampleArray software will now show that the rack is loaded into the selected location.



Figure 34 : One rack loaded.
The rack should then be loaded on the bed of the instrument.

6.4 Physically loading racks

The physical location of a rack is determined by positioning pins that secure it against three fixed posts.

To place a rack into position, angle it to the back so that the left side of the rack engages with the three pins. The front of the rack can then be pushed down to secure it into position.

On the 384 version, ensure that the lip on the base of the rack is clipped under the shoulders of the location pins.

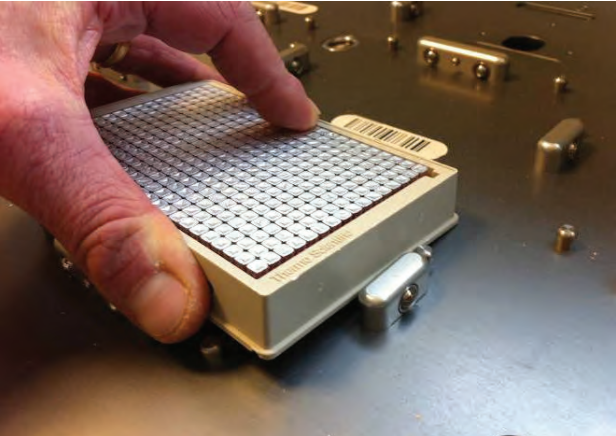


Figure 35 : Physical loading of rack (384 Version)

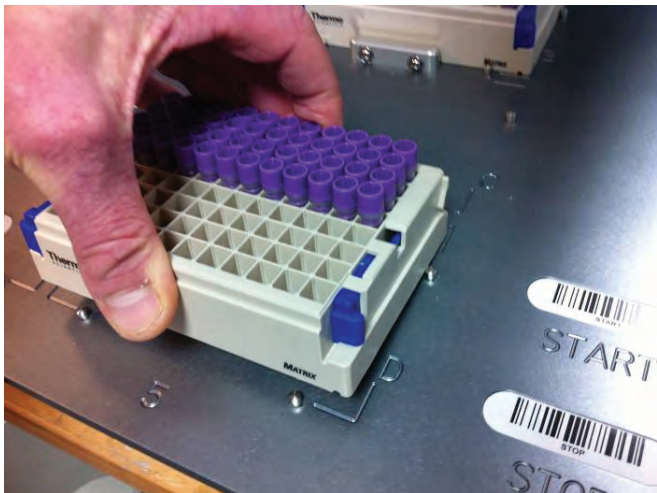


Figure 36 : Physical loading of rack (48/96 Version)

Loading by clicking the rack menu

To load the rack using the mouse, first click on the bed mimic to select a rack location. Then click on the Load button on the rack mimic.

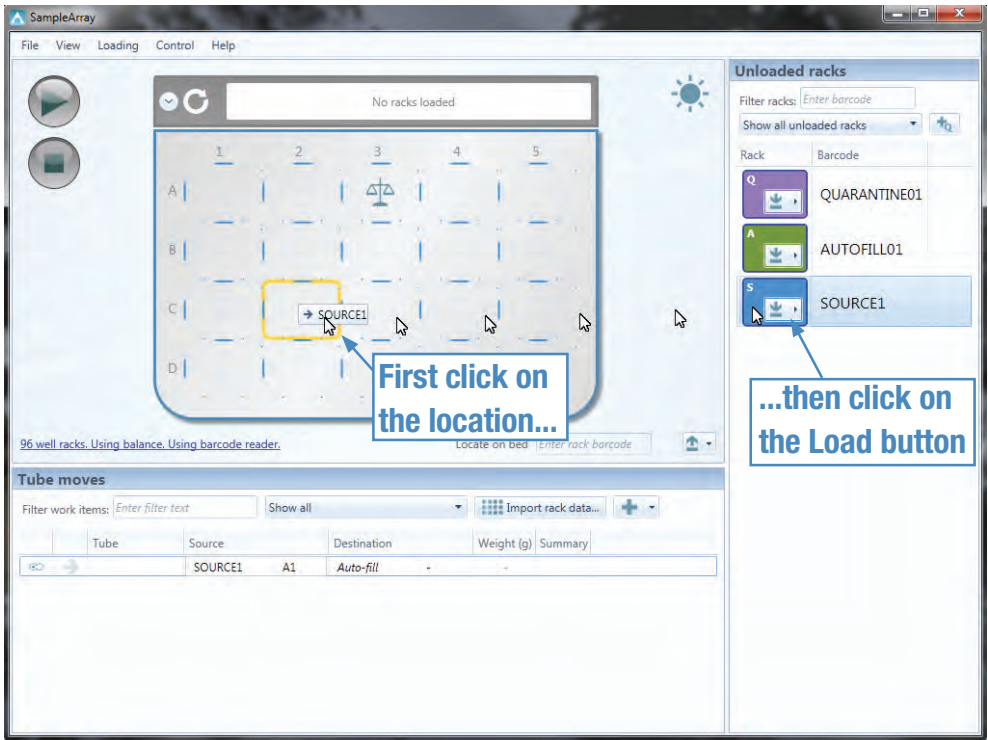


Figure 37 : Clicking load to load rack.

The bed mimic will now show that the rack is loaded into the selected location.

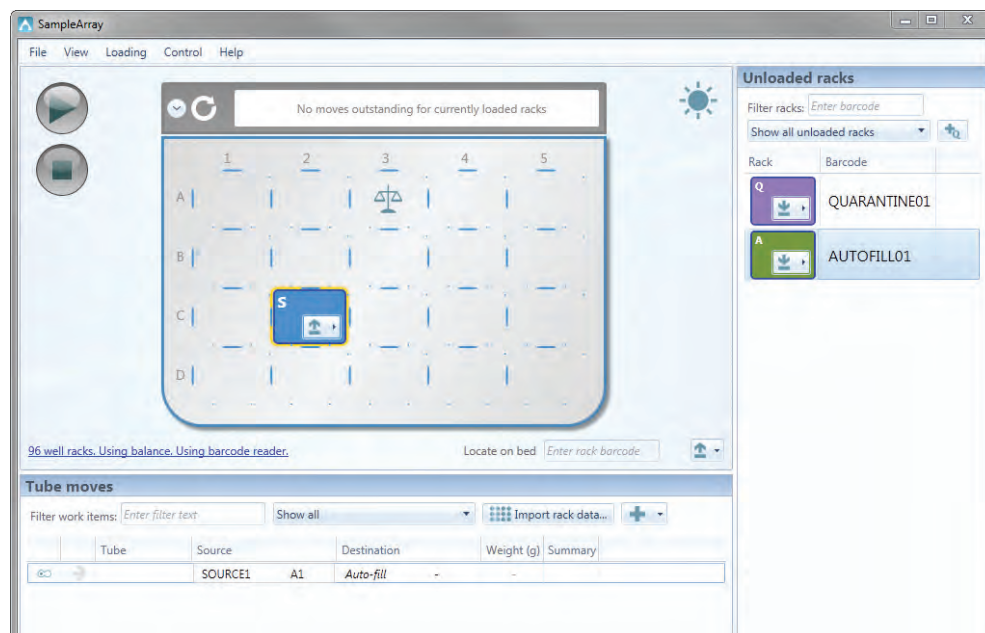


Figure 38 : one rack loaded.

Loading the rack using drag-and-drop

Instead of selecting location and clicking the load button, the rack can be dragged from the “Unloaded racks” list and dropped on to the bed mimic.



Figure 39 : Using drag-and-drop to load the rack.

By whichever approach, all three racks should be loaded on to the instrument bed.

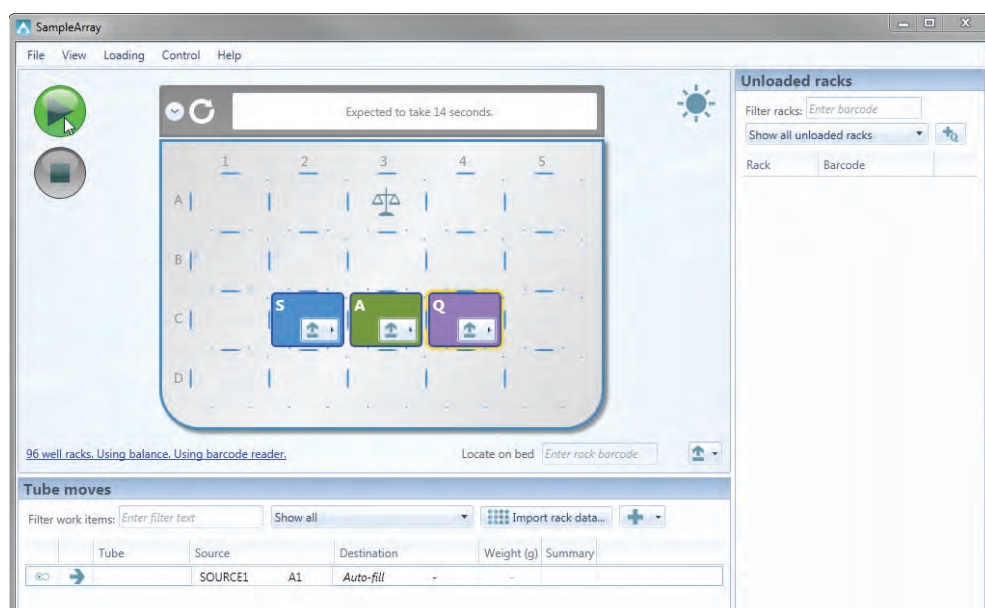


Figure 40 : All racks loaded on the bed.

Managing Rack Workflow

The SampleArray handler can load work lists that require many more racks than will fit on the bed.

To facilitate this, the Rack List uses active ordering:

- 1) Racks that still have moves to or from them are shown higher up in the list than Racks that are finished with moves.
- 2) At the very top of the list are Racks that the unit recommends you load: loading them will result in more moves being ready to run. For example, when you load a rack, any other racks with tubes to be moved to the loaded rack will move to the top of the Rack list.

6.5 Running the work list

Once there is at least one move that can be completed with racks that have been loaded, it is possible to start running the work list. If multiple moves have been defined in the work list, only those for which all required racks have been loaded will be run.

Note: If Quarantine rules are used, a Quarantine rack with free space must be loaded.

Moves for which all racks have been loaded are identified with a bold right arrow at the left of the work item (TUBES 1 and 2 shown below); if the required racks are not loaded, the right arrow will remain pale grey (TUBES 3 and 4).

Valid moves are executed in the order in which they appear in the worklist.

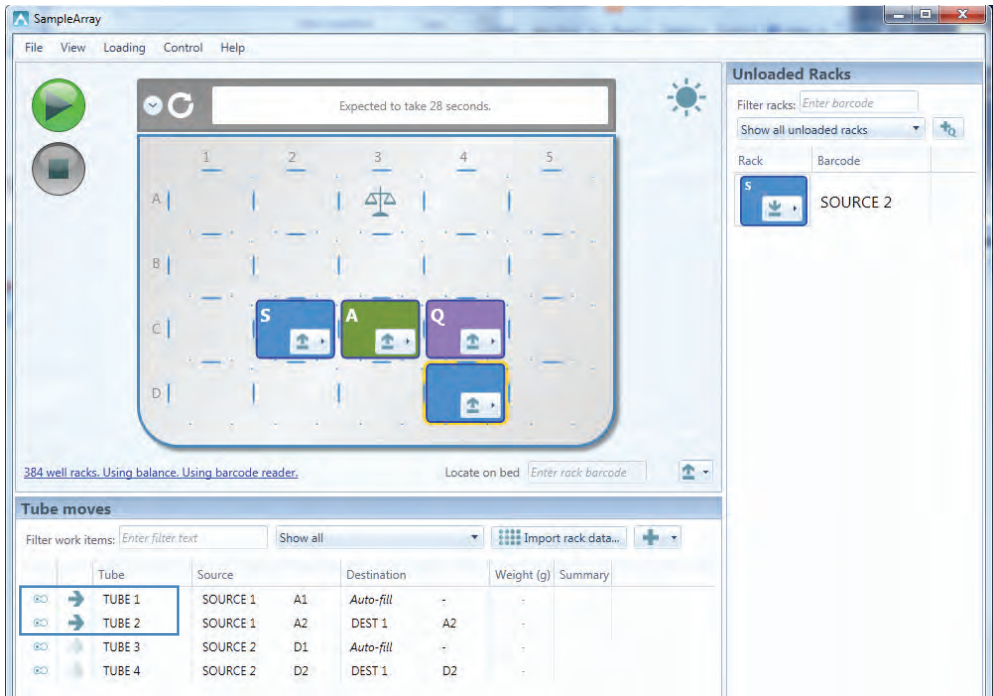


Figure 41 : Ready moves indicated.

Starting the work list

There are three ways to begin running the work list:

- Select the **Run** button

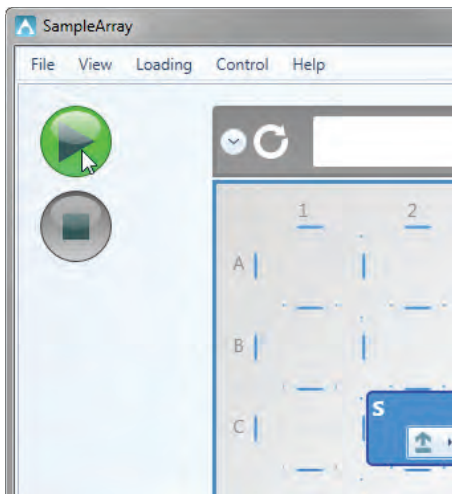


Figure 42: Click run to start

- Scan the **Start** barcode located on the front right of the instrument bed
- Select **Run forwards** from the Control menu

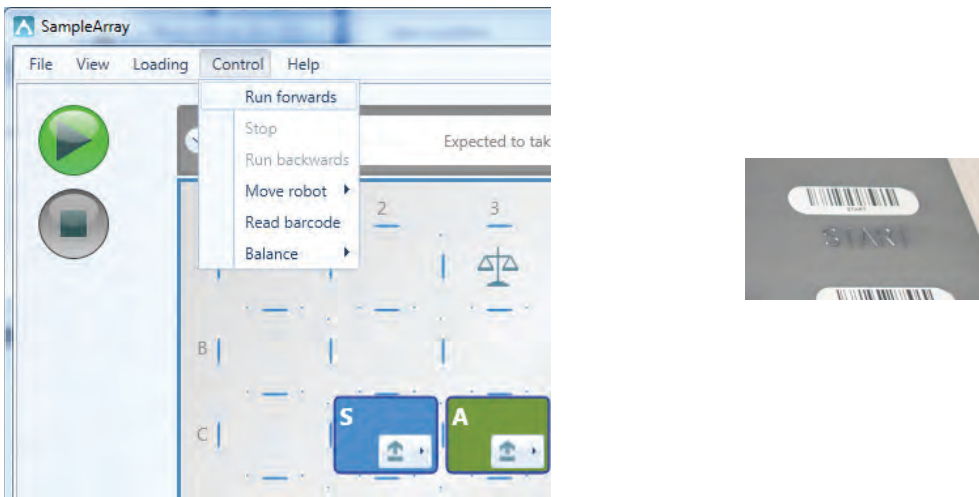


Figure 43 : Select Run forwards to start.

If using the 48/96 format SampleArray unit, the following dialog might now be shown:

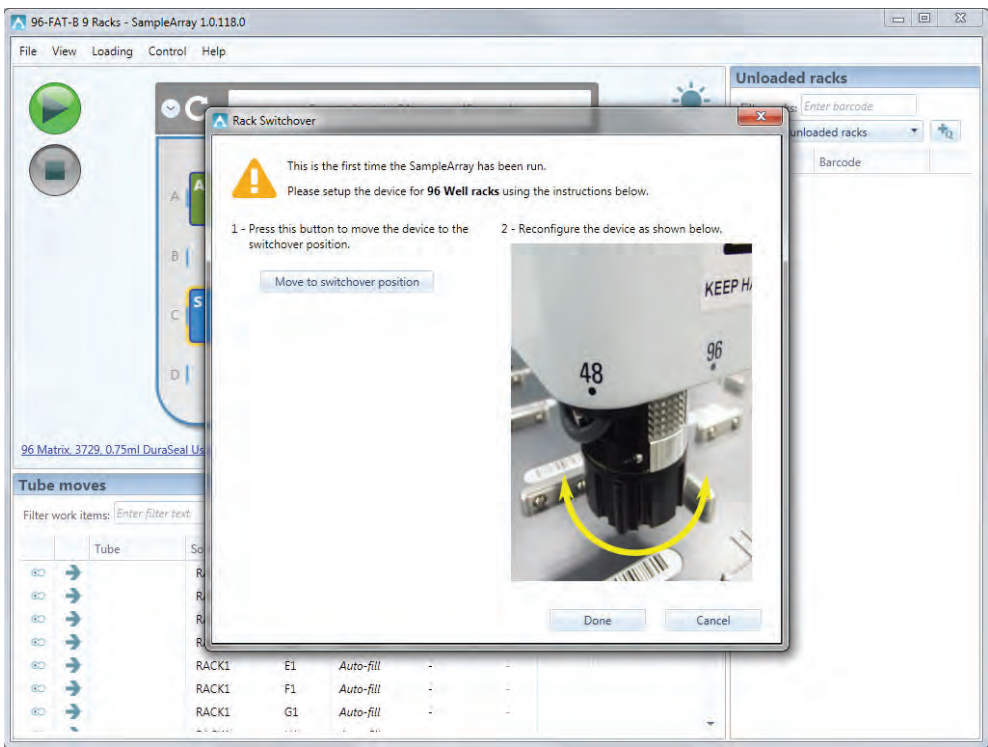


Figure 44: The switchover dialog

This dialog guides the user through the process of configuring the tube picker for the current labware type. Once this is completed, the instrument will start running the work list.

Running the work list

Depending on the options fitted and selected, the unit will pick the tube, move it to the 2D barcode reader, scan the barcode, deliver it to the balance, weigh it, and then move it to the destination location.

While the work list is running, several visual indications are provided on the user interface.



Figure 45 : Visual indication of running – arrow rotating.

The circular arrow on the instrument mimic will rotate while the instrument is running.

The icons to the left of the tube moves will change to indicate the tube position and the status of each move.

The dot within the icon on the left will move from right to left, denoting the location of the tube, also briefly showing icons for the barcode scanner and the balance as appropriate.

The green arrows will change to a bold tick as moves are completed successfully.

If the **Follow active move** option is selected the table will scroll to keep the current tube move visible.

At any point while running the work list, a graph indicating the progress can be shown by selecting the icon to the left of the circular arrow on the instrument mimic.

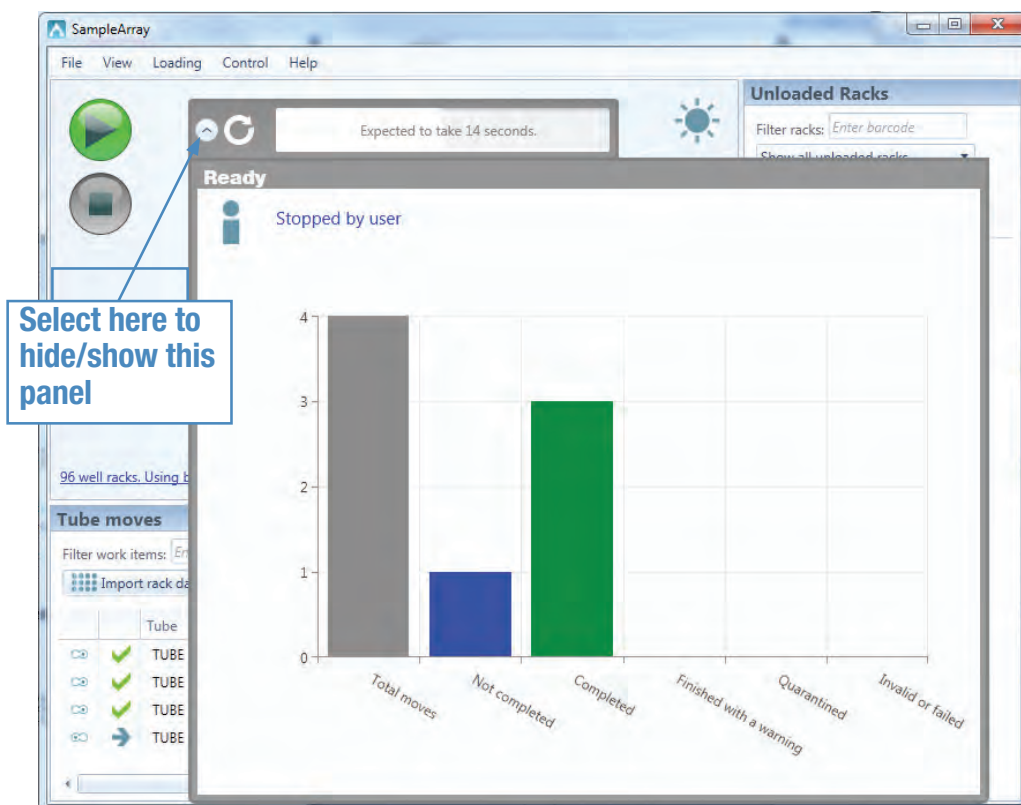


Figure 46 : Work list progress graph

This display will also be shown after the run has stopped.

Stopping the work list

At any point while the work list is running, it is possible to stop the instrument, using one of three methods

- Select the Stop button

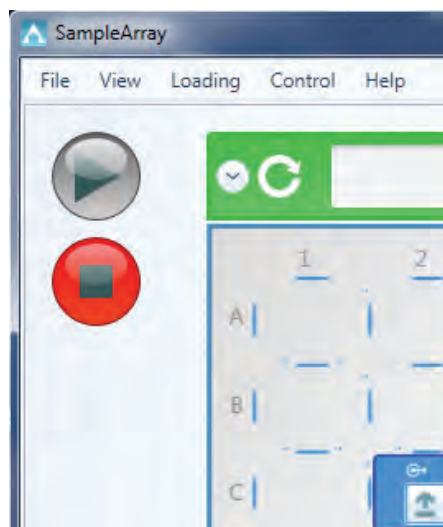


Figure 47 : Stop button.

- Scan the **Stop** barcode located on the right of the instrument bed
- Select **Stop** from the **Control** menu

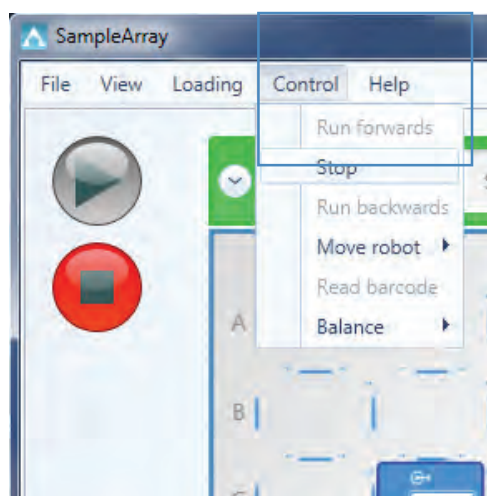


Figure 48 : Stop via Control menu.

When Stop is selected, note that SampleArray will complete the current move including barcode reading, weigh and placement to destination location

Running backwards

When the work list is stopped, having partially or fully completed, it is possible to return the system to the initial configuration with all moved tubes back in their original locations, by running the work list backwards.

To do this, select Run backwards from the Control menu

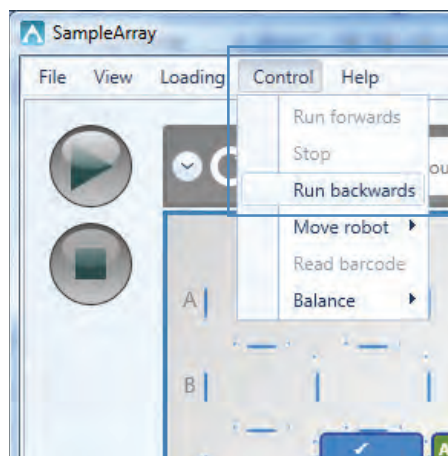


Figure 49 : Select Run backwards.

Resolving from Quarantine

After completing a work list, depending on the run setup configuration and the results of barcode and weight checks, some tubes may have been placed in the quarantine rack(s). The SampleArray software allows these tubes to be moved to specified locations by using the **Resolve Quarantine tubes...** option. This can be selected by one of two methods.

- Select **Resolve Quarantine tubes...** from the **Loading** menu.

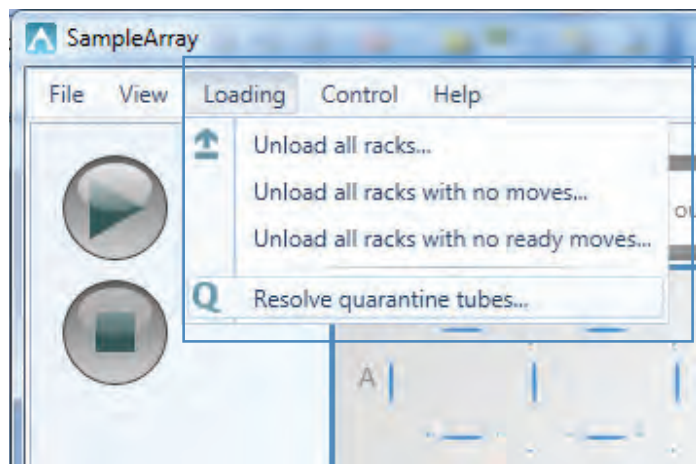


Figure 50 : Select Resolve quarantine tubes.

- Select **Resolve Quarantine tubes...** from the Quarantine rack on the bed mimic

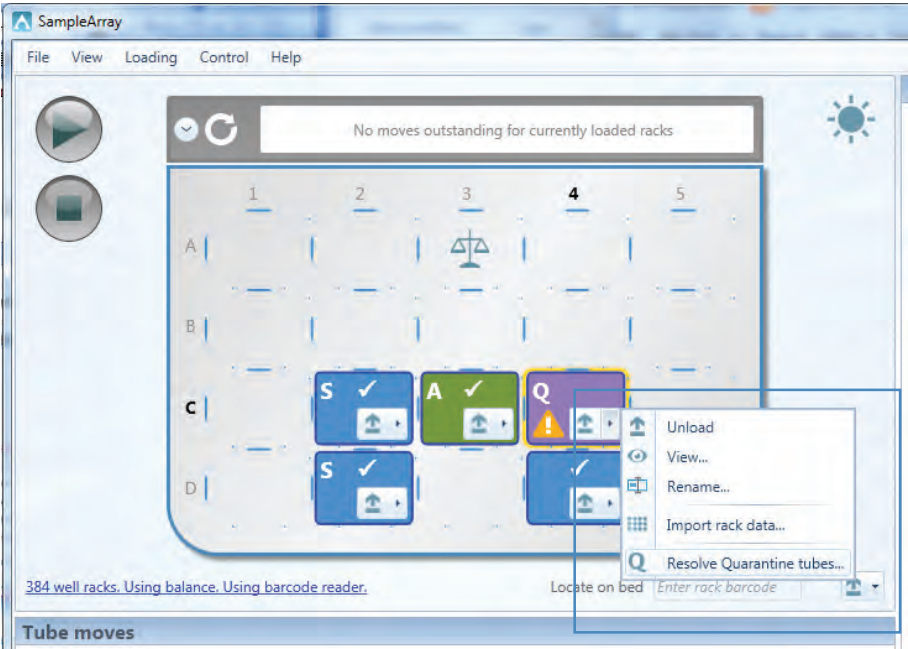


Figure 51 : Select Resolve quarantine rack from bed mimic.

After selecting **Resolve Quarantine tubes...**, the following screen will be displayed, giving options for the quarantined tubes. Different options may be selected for different tubes.

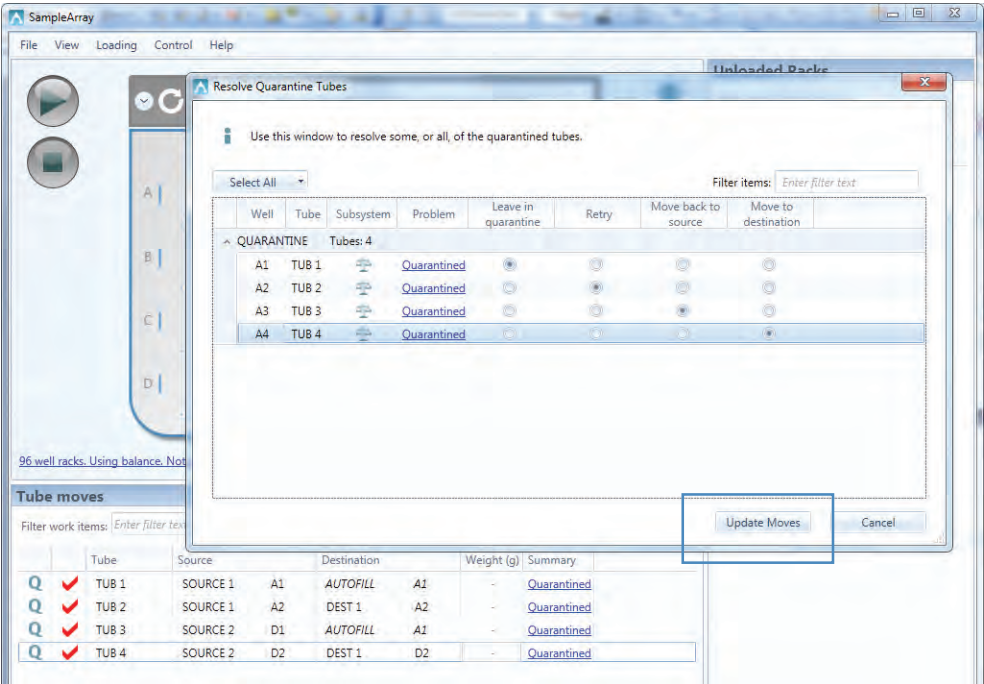


Figure 52 : Resolve quarantine options.

After choosing the desired option for each tube, select **Update Moves** and the work list will be updated, showing the revised options.



Figure 53 : Updated tube moves after quarantine resolved.

The revised work list may then be started using the same methods as for the original work list. Quarantine resolving moves will be performed before any new moves.


6.6 Checking Status

The Status of the instrument is always displayed by the bar above the bed mimic. The color of the bar gives an instant indication of the status:

Bar Color	Status
Grey	Idle: instrument is idle, which may be: <ul style="list-style-type: none">- Before any work is loaded- Before the available work has started- After the available work has completed
Green	Normal Operation: instrument is processing the worklist normally
Red	Operator attention is required to recover from an unexpected result (see Section 6.6).

Further details are available by clicking the downward arrow button  on the left of the bar. This pulls down an additional pane of information.

Note: The main application (including the start/stop buttons) can still be interacted with while the information pane is displayed. The pane may be left on display while the instrument is running, providing additionally visual information on the progress of the run.

The pane can be hidden again using the up arrow button  on the top left of the pane. Hiding the pane has no effect on the status or operation (for example, you can hide a red Recovery pane while you consider what option to choose).

During normal operation, the status pane shows a bar graph of the state of the tube moves. In each column the height of the bar indicates the number of tube moves in that particular state. The darker color indicates the total for the racks that are currently loaded on to the bed.

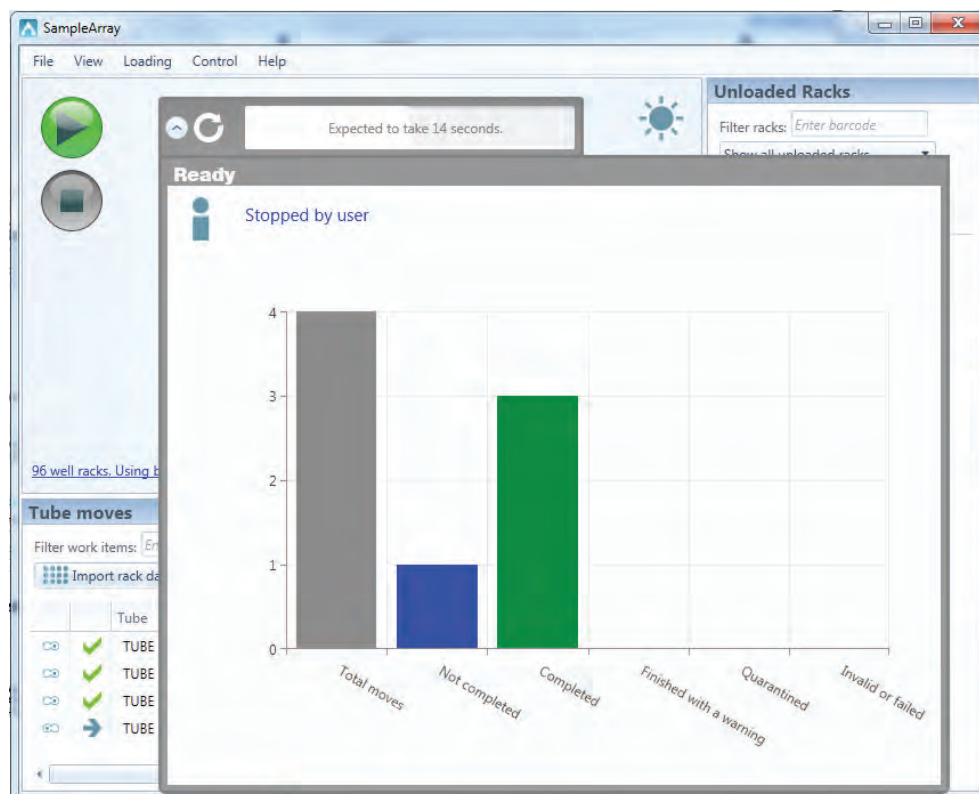


Figure 54: The work graph

6.7 Handling of unexpected results

When defining the Run setup configuration, it is possible to specify several different actions if a barcode or weight is not as expected. One of these actions is to ask the operator for guidance. There may also be errors for which no specific action is defined, for example a problem with the robot movement or with the tube gripper mechanism.

In these cases a recovery screen will be displayed, with a range of options. After selecting the desired option, running can re-commence using any of the normal methods.

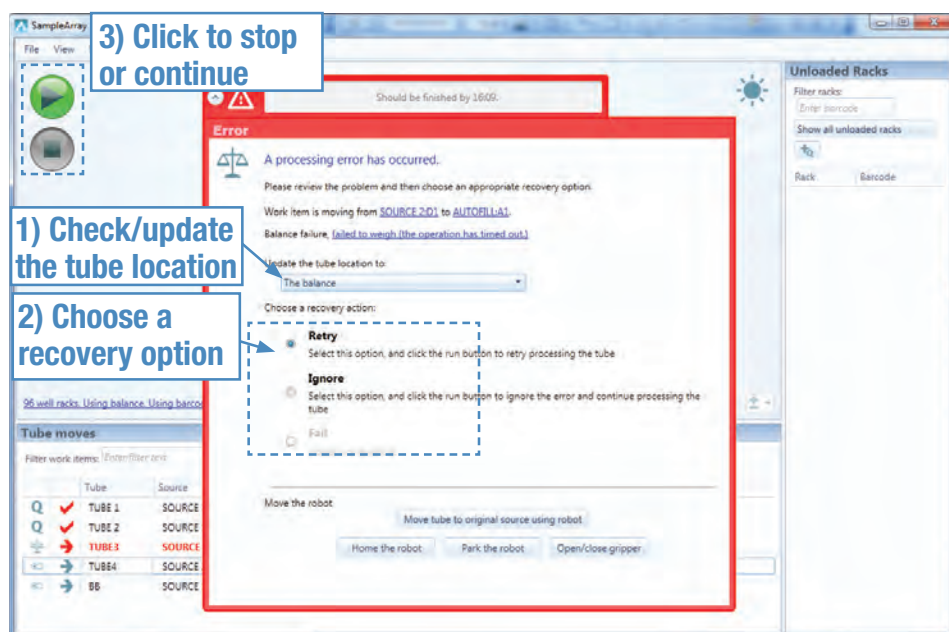


Figure 55 : Overview of the recovery process

This recovery screen includes the following information

- The intended source and destination location for the tube move
- The error that caused the recovery screen to be displayed. Selecting this description will display the tube move actions
- The current tube location

Initially this location will indicate the current location of the tube based on the information available to the software. If the location is incorrect, as a result of a physical constraint or some manual intervention, it should be modified to reflect the real location.

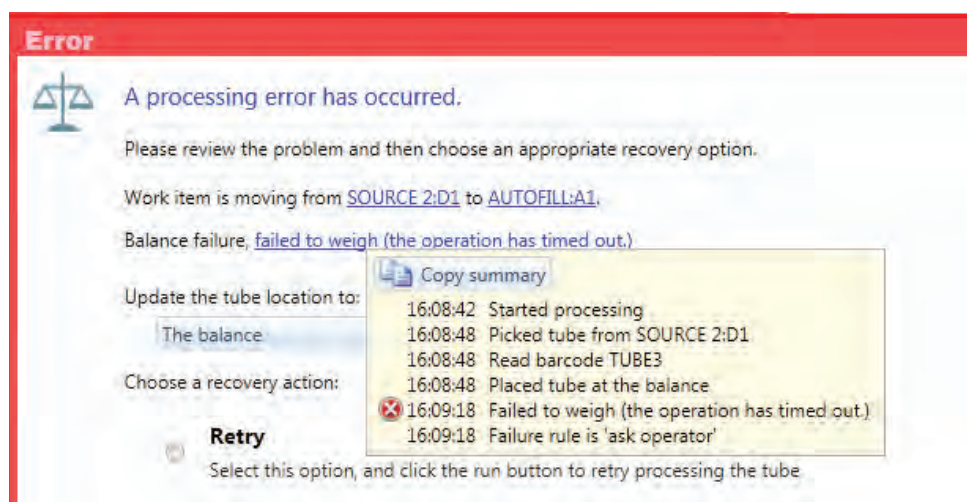


Figure 56 : Recovery screen - tube move summary.

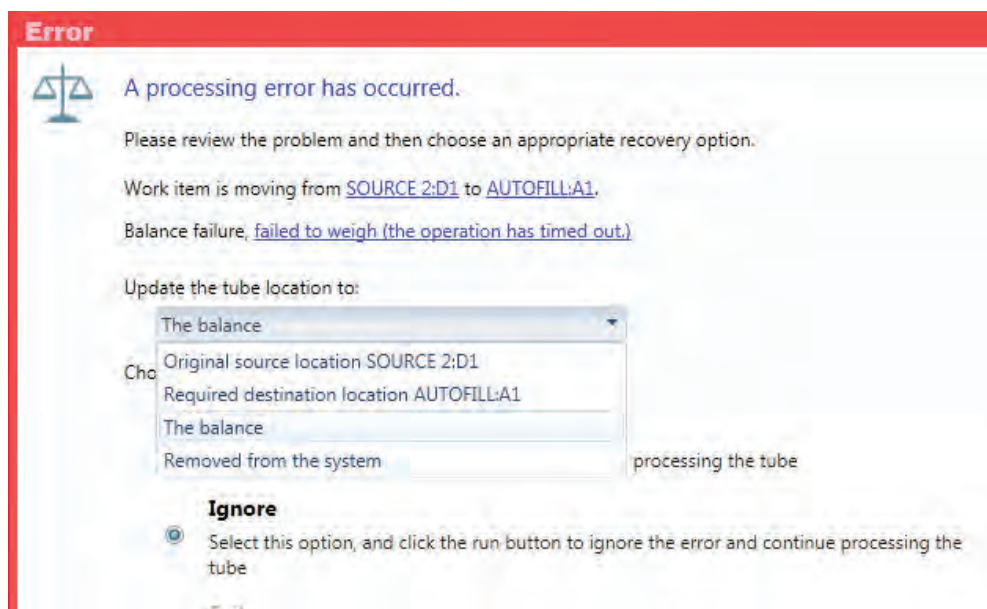


Figure 57 : Recovery screen - tube location.

- The available recovery actions:

Depending on the current location of the tube, the available recovery actions will be one or more of the following : **Retry**, **Ignore** or **Fail**.

The recovery screen also provides options to move the robot arm. This may be of use when wanting to manually relocate or remove a tube.



Figure 58: Recovery screen - move robot options.

6.8 Unloading labware from the bed

When the work list is stopped, having partially or fully completed, racks may be unloaded from the bed. Fully completed racks are identified by a tick.

This can be done one rack at a time by using the Unload button on the rack mimic or by scanning either the barcode of the rack to remove, or the barcode of the location it was in.

On the 384 model, it is normal for small shavings of foil from the outside of the seals to be left on the bed by the novel "friction gripper" mechanism. This does not affect the seal integrity or system operation, and the shavings have not been in contact with the tube contents. See Section 9.1 for the recommended cleaning protocol.

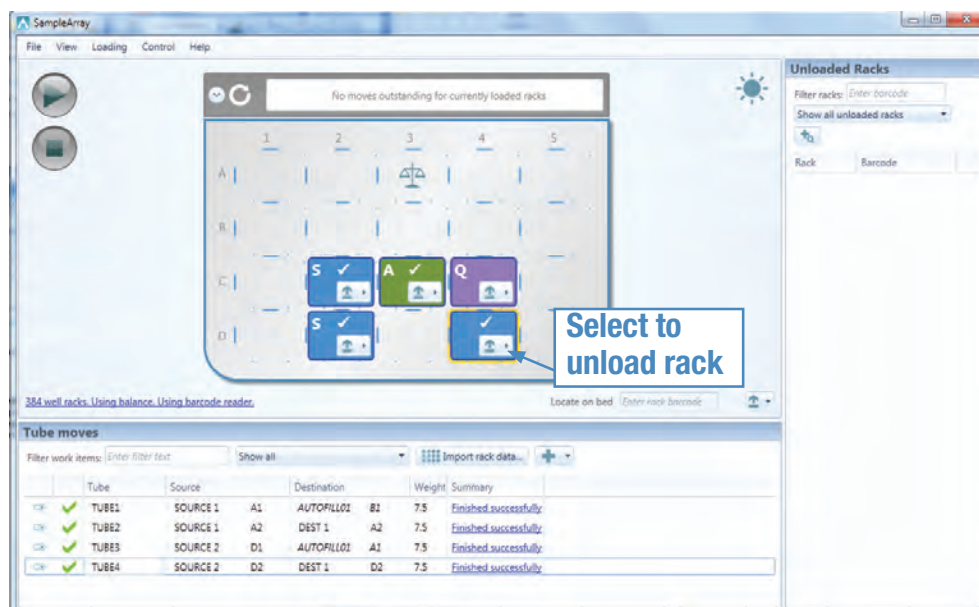


Figure 59: Unload rack using rack mimic.

It is also possible to unload multiple racks simultaneously using the **Loading** menu. There are options to:

- **Unload all racks...**
- **Unload all racks with no moves...** - Unloads all racks for which all moves have been completed
- **Unload all racks with no ready moves...** - Unloads all racks for which no moves can be completed with the currently loaded labware.

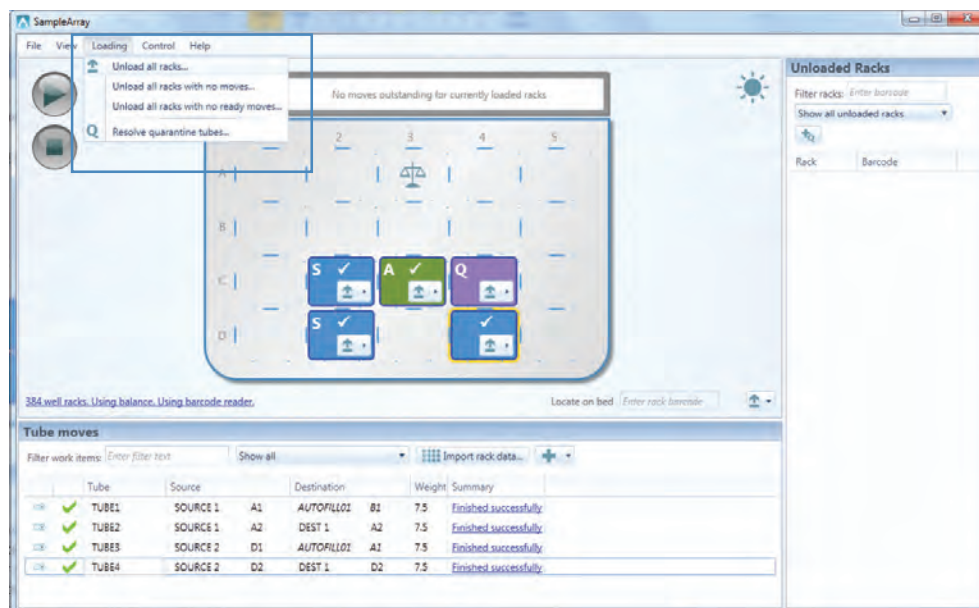


Figure 60: Unload racks using Loading menu.

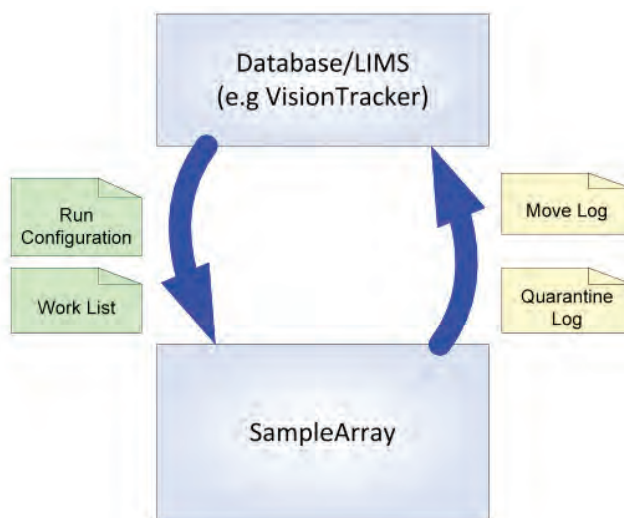
6.9 Saving and loading the session

When the SampleArray software is closed down (intentionally or otherwise) it will attempt to preserve the current state of play: all the tube moves, current tube position, and move history and also the rack loading of the bed. This file will then automatically be loaded when the software is next started.

Additionally the user can explicitly save this data at any time as a “session” file using **File->Save session...** This file can then be reloaded later using **File -> Load session**.

Chapter 7 - Additional Features

7.1 Database/LIMS Integration



The SampleArray unit can integrate with an external database system by passing files back and forth. The Run Configuration file and Work List describe the work to do and the Move Log and Quarantine Log describe the work that was done.

7.2 Defining File configurations

The SampleArray system provides the ability to change the configuration of the files that are used to store work lists, rack data and move and quarantine logs.

To view or edit these file configurations, from the **View** menu, select **File configuration...**

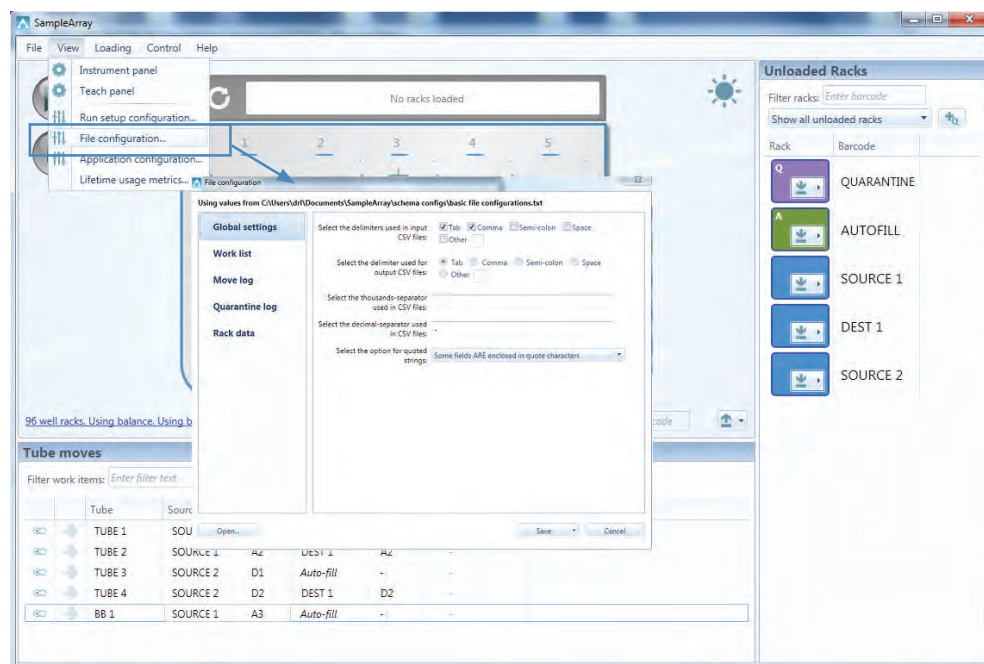


Figure 61: Select File configuration screen.

Editing the File configuration

The **Global settings** screen allows the selection of options that will be common to all the generated files.

The options to select the delimiters used for input and output files allow the characters that indicate the gaps between values to be defined. In the example shown below, in input files, values must be separated by a comma, while in output files i.e. files generated by the SampleArray system such as quarantine logs, values will be separated by tabs.

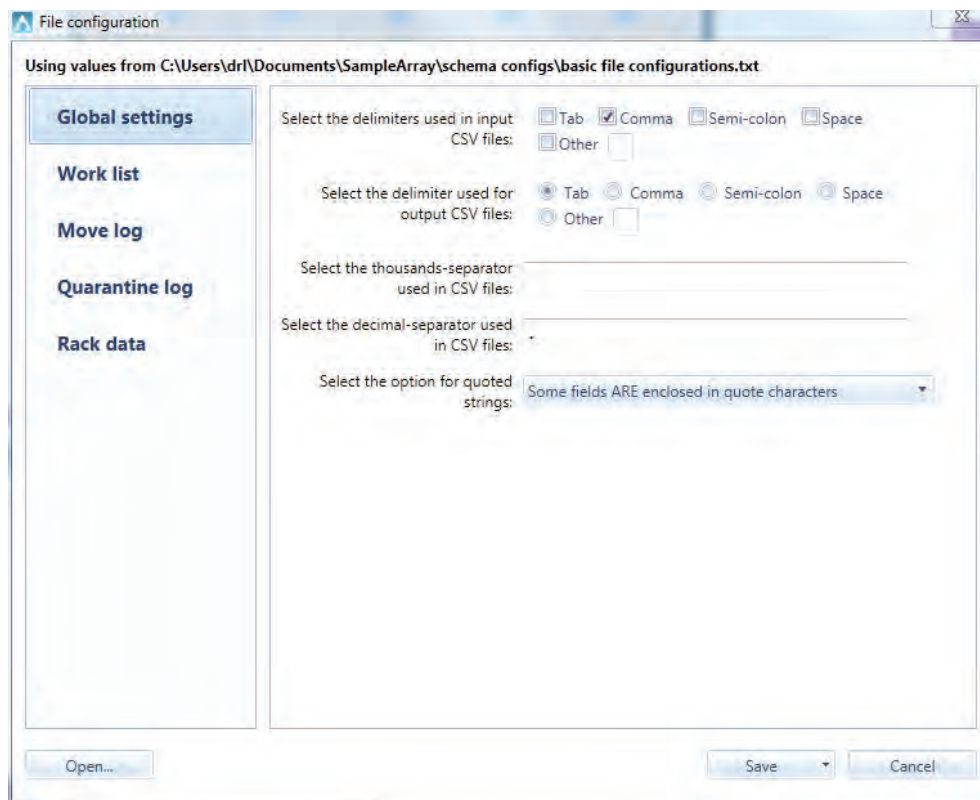


Figure 62 : File configuration - Global settings

The **Work list**, **Move log**, **Quarantine log** and **Rack data** screens are all similar and allow the format of these files to be defined.

The first row of the can be defined as a header and columns can be selected or removed as required.

If a column is not required, it can be drag-and-dropped from the **Configured column** box into the **Available columns** box and vice versa

It is also possible to change the order of the **Configured columns** by drag-and-dropping within the box.

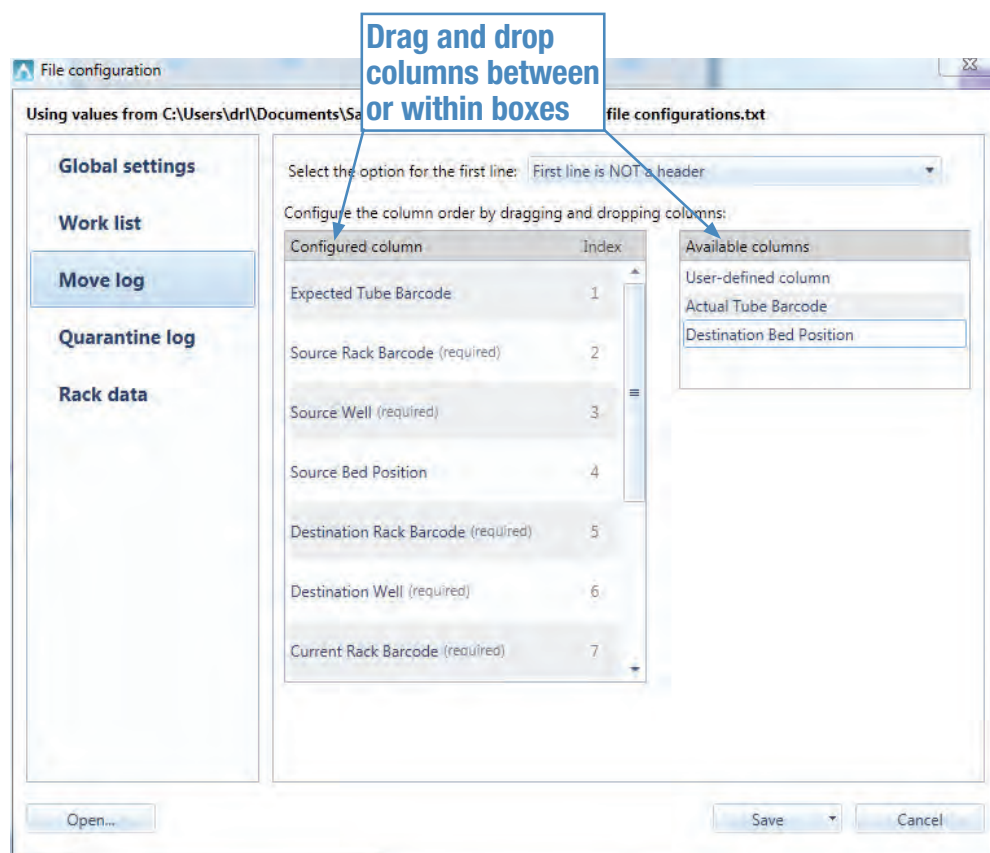


Figure 63 : File configuration - move logs.

Saving the File configuration

Having selected all the desired settings, it is necessary to save the configuration – selecting **Cancel** will lose any changes that have been made.

To Save the settings under the current configuration, select **Save**

To Save the settings to a new file, selected **Save as...** (from **Save** pull down menu)

7.3 Defining the Application configuration

The **Application Configuration** contains a collection of settings that specify the required arrangement of the SampleArray system. In general these settings are less likely to be changed than those covered within the **Run setup configuration**.

To view or edit this configuration, from the **View** menu, select **Application configuration...**

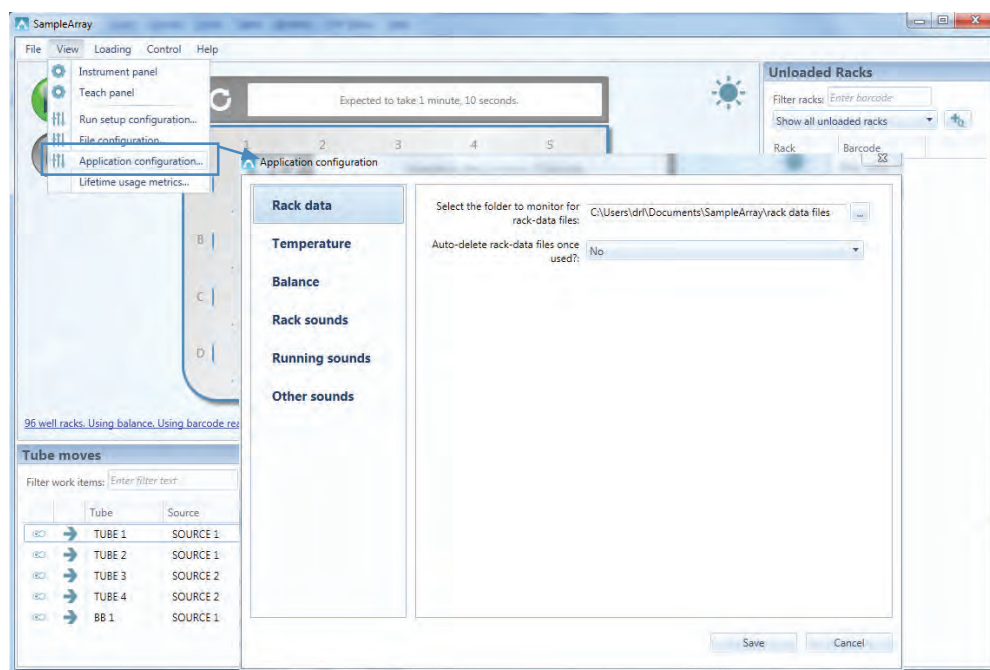


Figure 64 : Select Application configuration- Rack data screen

Editing the Application configuration

The **Rack data** screen indicates the default location where files containing Rack data are stored (see Section 6.2.4). It is also possible to browse to other locations. This should be set to the same directory that the 2D barcode rack reader exports files to.

There is also the option to automatically delete rack data files once they have been used.

The **Temperature** screen specifies whether the SampleArray system is running at room temperature or at -20°C.

WARNING If the optional Balance module has been fitted, this must be removed by a qualified technician before the instrument is moved to an environment below +10°C.

WARNING Operating the unit while the wrong temperature is selected could result in pick/place failures.

The **Balance** screen specifies whether to calibrate the balance when starting to run a work list and also gives the option for an immediate calibration. Calibration should only be required occasionally, for example after the unit has been moved.

The remaining screens specify the sounds to be generated by the SampleArray system in various situations – loading and unloading of racks, work list starting and stopping running and invalid barcode detection.

Saving the Application configuration

Having selected all the desired settings, it is necessary to save the configuration – selecting **Cancel** will lose any changes that have been made.

To Save the settings, select **Save**. Only one Application configuration can be saved.

7.4 Viewing usage metrics

The SampleArray system maintains a record of usage metrics covering such items as the total number of tube moves, the average tube move duration and the number of unexpected barcode readings.

To view these metrics, select **Lifetime usage metrics...** from the **View** menu.

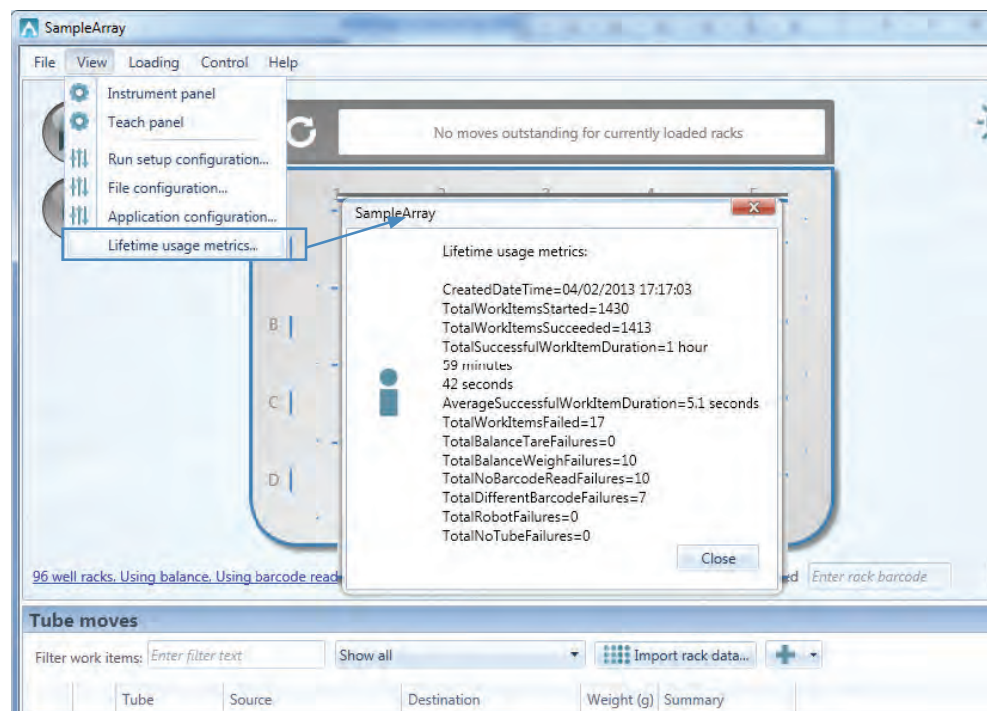


Figure 65: Select usage metrics.

7.5 Moving the robot

There may be occasions when it is necessary to move the robot arm separately from the moves that are defined in the work list. This could occur after a mechanical problem with the instrument or an issue with the tube gripper mechanism.

To enable this, select **Move robot** from the **Control** menu.

Five options for moving the robot are shown.

- **Home the robot** – move the robot to the rear right hand side of the bed and calibrate its position
- **Park the robot** – move the robot to the front centre of the bed
- **Move robot to changeover position** – move the robot to front centre of the bed and lower the gripper mechanism (for the 48/96 format compatible version)
- **Raise the gripper to safe travel height** – fully raise the gripper mechanism
- **Open/close gripper** – open, then close the gripper mechanism (for the 48/96 format compatible version)
- **Eject tube** – push any tube out of the gripper (for the 384 version format compatible)

Each can be selected individually and independently of the other options.

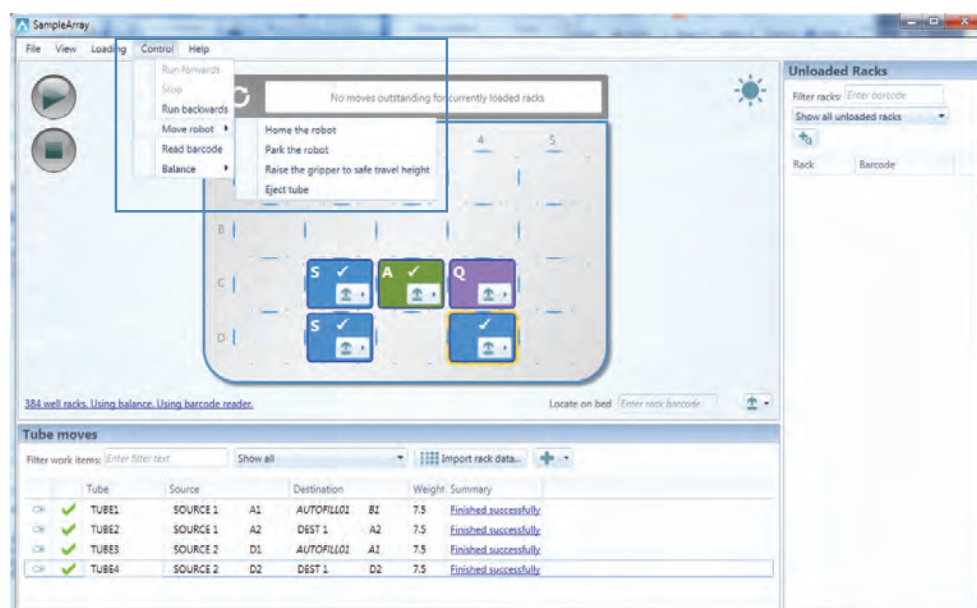


Figure 66: Move robot options (384 model).

7.6 Read barcode

It is possible to activate the barcode reader to allow tube barcodes to be checked manually.

If this is required, select **Read barcode** from the **Control** menu.

A tube can then be held over the barcode reader, with the barcode facing downwards and the barcode will be read and shown on the screen.

Note: the Run Setup Barcode Rules must be set to **Always read the tube barcode** for this option to be effective.

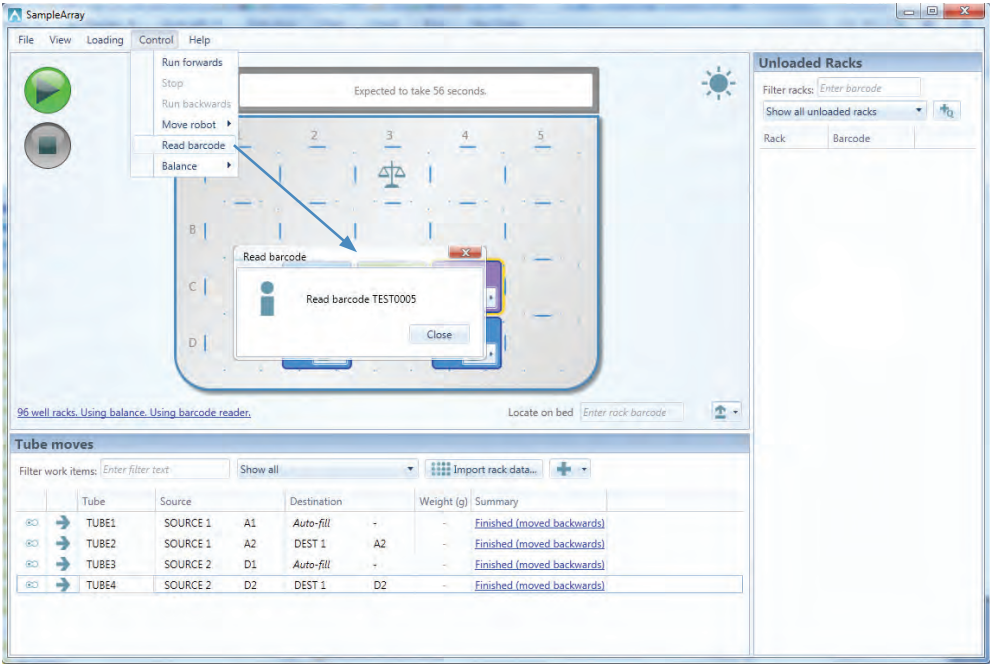


Figure 67: Read barcode

7.7 Using the balance

As with the barcode reader, it is possible to use the balance without defining tube moves in a work list.

To enable this, select **Balance** from the **Control** menu.

Three options for using the balance are shown:

- **Calibrate** – calibrate the balance. Calibration should only be required occasionally, for example after the unit has been moved
- **Tare** – tare the balance
- **Read the weight** – weigh the tube that has been placed in the balance. The result is shown on the screen

Note: The Run Setup Balance Rules must be set to Always weigh the tube for these options to be effective.

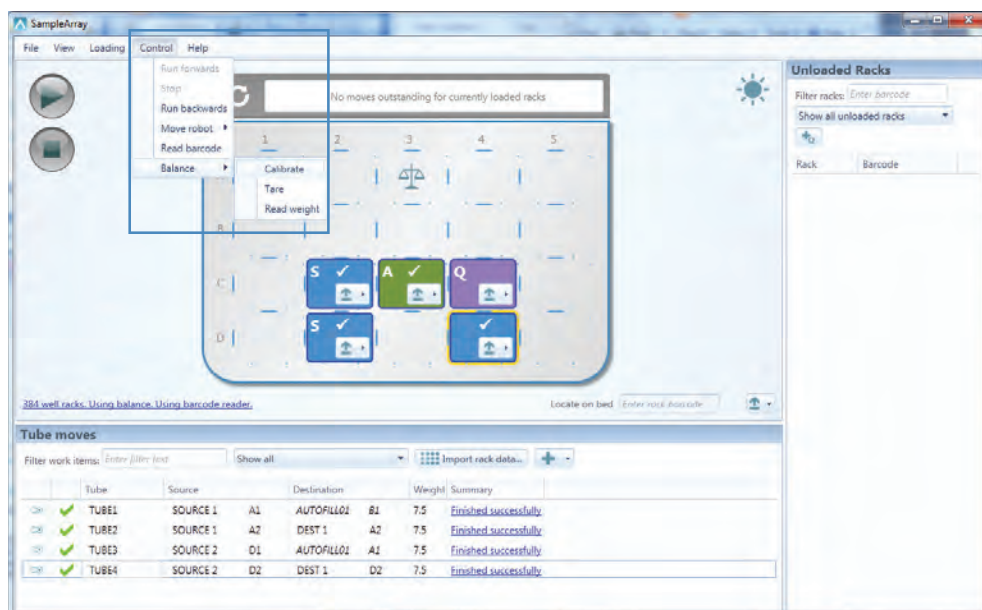


Figure 68: Control - balance options.

7.8 The Help menu

The **Help** menu gives access to files showing the configurations and previous activities of the SampleArray system. It also allows the system to be set up for demonstration.

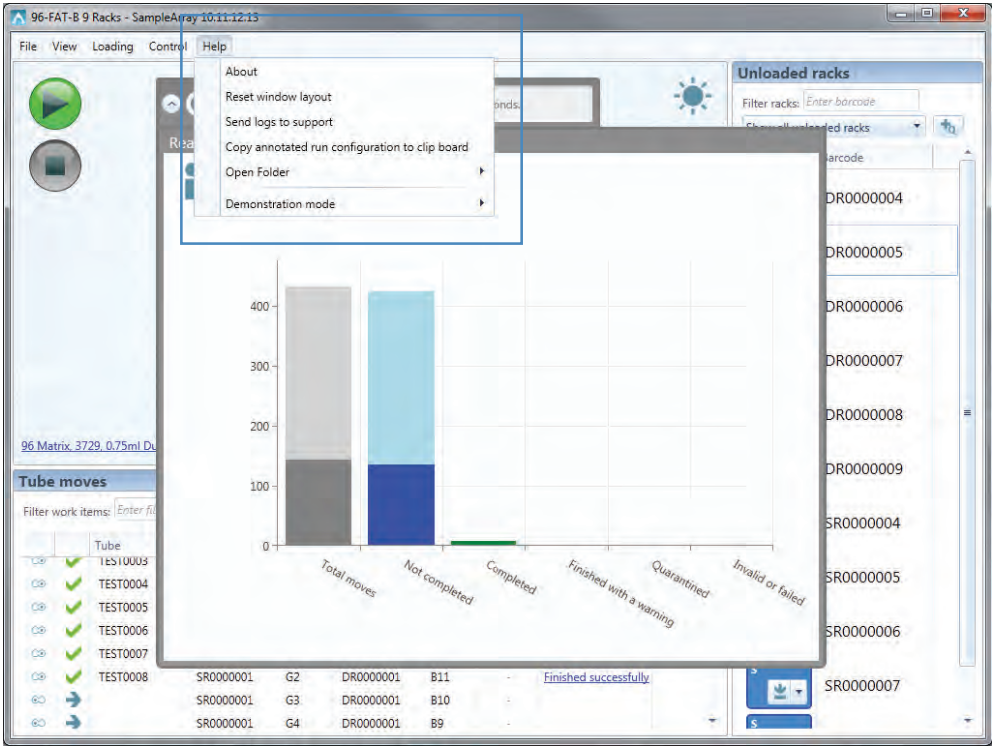


Figure 69: Help menu options

Help \ About

The Help \ About screen shows details regarding the software versions and licenses.

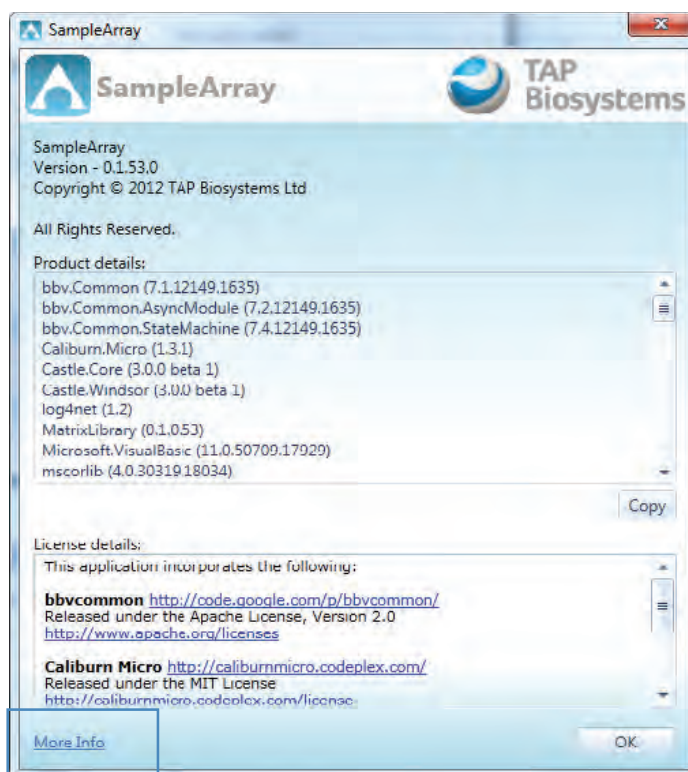


Figure 70 : Help \ About screen

Help \ Reset window layout

The **Reset window layout** feature restores the window and panes to their default sizes.

Help \ Send logs to support ...

The software logs are a detailed audit of the actions the software and hardware have been making. They will be invaluable to a support engineer trying to diagnose unexpected, unhandled or unusual error states. The **Send logs to support** menu item will zip up the software logs. It will then either open a default email client or place the logs in the clipboard from where they can be pasted into an email. If email is unavailable they can be pasted into a folder or memory stick for later reference.

Help \ Copy annotated run configuration ...

The **Copy annotated run configuration to clip board** feature generates a detailed listing of the current run setup configuration, with explanatory notes, and places it on the PC clipboard. From there, it can be pasted into other applications e.g. Windows® Notepad, Microsoft® EXCEL® etc.

Help \ Open Folder

The **Open Folder** option gives access to the folders containing files which define the run configurations, work lists and rack data. Move, Quarantine and instrument debug logs are also available.

Help \ Demonstration mode

The SampleArray system can be set to run continuously if this is required for demonstration purposes. If this option is selected, when started, the system will run through the loaded work list and then when the final move is completed, run backwards until the system is back in its initial state. This cycle will repeat until the system is stopped.

Help \ Bounce back out of quarantine

The **Bounce back out of quarantine** option controls what happens, when running backwards, to tubes that have been quarantined. If this option is selected tubes will be taken from the position in the quarantine rack and put back in their source location. If this option is not selected they will be left in the quarantine rack.

8

Chapter 8 - Switching Operation Between Room Temperature and -20°C

The SampleArray unit is able to operate at room temperature and in a frost-free freezer at -20°C. It is possible to move the unit from one environment to the other, providing appropriate care is taken.

⚠ WARNING If the SampleArray unit is fitted with the optional Balance, this must be removed by a qualified engineer before the unit is moved to an environment less than +10°C

- Shut down and power off the unit before attempting to move
- Remove all tubes and racks from bed and gripper
- Disconnect power and USB leads
- Take care when lifting and make use of lifting handle on top of rear back plate
- Never lift unit using gantry
- Place unit on stable surface
- Ensure all 4 feet are in contact with table
- Level bed using adjusters on feet
- Check bed is level using bubble indicator

When moving from -20°C to room temperature, moisture will form on surfaces due to air condensing. It is essential that any moisture is removed before the unit is switched on.

⚠ WARNING Serious damage may occur if the SampleArray unit is powered up while there is moisture on the electrical components behind the rear cover.

After restarting the instrument it will be necessary to change the configuration. This can be done via the Application Configuration panel

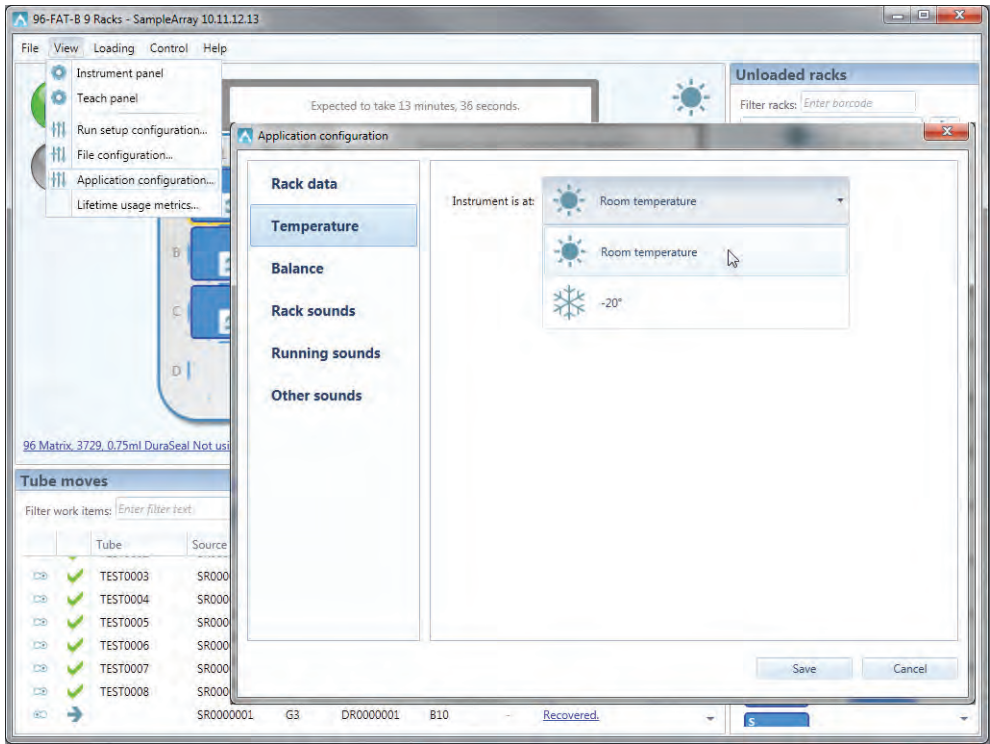


Figure 71: Changing the operating temperature

The unit has been configured at the factory to run at both -20°C and room temperature. After changing temperature, it is recommended that the robot teach points are checked –contact your service agent or Thermo Fisher Scientific (see Section 1.3).

9

Chapter 9 - Troubleshooting

9.1 What to do if the application does not connect to the instrument

If the software is stuck at the “Searching” stage (see Figure 9: Searching for instrument), it has not found the integral memory stick inside the instrument.

Check that the USB cable is plugged in at both ends and the instrument is turned on. (Confirm that the USB port on the Computer is a USB 2 connection).

If the software is stuck at the “Connecting” stage (see Figure 10: Connecting to instrument), then it has not found one or more of the devices.

If either the **Main Control Board** or **Gripper Control Board** has not been found, check that you are not using a USB 3 port. The SampleArray unit must be connected to a USB 2 or USB 1 port to operate. Next, try turning the instrument off and on again. You will also need to restart the software.

If either the **Tube BCR** (Barcode Reader) or **Balance** has not been found, try turning the instrument off and on again. You will also need to restart the software. If the problem persists, and you do not need to use the device which is not found, then edit the Run Setup configuration to not use the device (see Section 6.1).

9.2 What to do if a 384-way tube is left behind in a rack

- Check that the rack is seated correctly, and that there are no foil shavings or other debris around the rack location pins
- Home the robot and re-try the move

9.3 What to do if a tube is placed on top of another tube

Move the robot out of the way by:

- Selecting **Open/Close Gripper** to release the tube
- Selecting **Park Robot**
- Check that the racks have been loaded in the correct orientation
- Check that the racks have been loaded in the correct place on the bed

9.4 What to do if the Balance times out or takes unusually long

- Check that the instrument is on a stable surface, free of ambient vibration (e.g. from passing traffic)
- Check that the instrument is level

9.5 What to do if the Barcode reader fails to read any barcodes

- Turn the instrument off and on again. You will also need to restart the software.
- Use a USB Isolation device between the computer and the instrument

9.6 What to do if the Robot moves in a jerky fashion

- Ensure there are no obstacles in its path
- Arrange a service visit. While the instrument may operate correctly for some time, it is likely to need attention.

9.7 What to do if the Gripper hits tubes

- Ensure that the labware type selected is the same as the labware type which has been loaded (see Section 6.1.2)
- Ensure that the gripper is in the correct orientation (for 48/96 instruments, see Section Figure 44: The switchover dialog)
- Ensure that the racks have been loaded correctly:
 - Properly located within the rack holder
 - All corners flat to the bed
 - Plate skirt located under the detents (384 instrument only)
- If the problem persists, try re-homing the robot (see Section 7.5)
- If all else fails, get a qualified engineer to re-teach the robot

9.8 What to do if the robot has a problem at the balance

- Remove the access door, inspect the problem and recover using the software (see Section 6.5)

9.9 What to do if the software won't allow run to start even though racks are loaded

- Load a Quarantine rack if Quarantining is selected

9.10 What to do if the application loses connection to the instrument unexpectedly

- Check that the instrument is still powered and the USB cable still in place
- Some older PCs may cause problems when other devices are connected or disconnected to USB ports. If this is a problem, use a USB Isolation device between the computer and the instrument

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10

Chapter 10 - Maintenance

⚠ WARNING Do not attempt to clean the SampleArray instrument when the gantry is moving. Contact with the gripper may result in injury.

⚠ WARNING Do not use abrasive cleaning agents or scouring pads.

10.1 Cleaning the 384-format compatible Instrument

On the 384 model, it is normal for small shavings of foil from the outside of the seals to be left on the bed by the novel “friction gripper” mechanism. This does not affect the seal integrity or system operation, and the shavings have not been in contact with the tube contents.

These shavings should be removed from the bed regularly (every few thousand pick/place cycles), paying particular attention to:

- The Barcode reader window (where excessive build up may impact barcode reading performance)
- The Balance receptor (which should not be pulled up during cleaning)
- The rack locating pins (as excessive build-up of shavings can lead to racks being mis-aligned)

Ideally, shavings should be removed by a vacuum cleaner, but brushing can also be used with care.

10.2 General Cleaning and Decontamination

The recommended cleaning method is a wipe down using 70% Isopropyl alcohol (IPA) or 70% Ethanol (EtOH) applied using a sterile cloth.

The SampleArray unit can also be biologically decontaminated using a hydrogen peroxide vapor (HPV) process. e.g. Bioquell™.

The following chemicals should not be used:

- Any chlorine based detergents or bleaches
- Any acidic cleaning agents
- Sodium Azide
- Iodine
- Ferric Chloride

Chapter 11 - Disposal

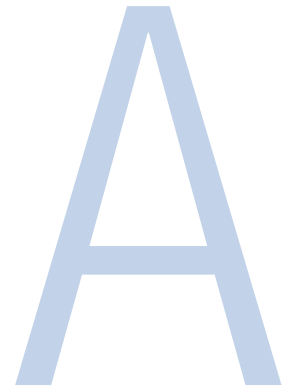
The SampleArray tube handler is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC, and is marked with the following symbol:



Thermo Fisher Scientific has contracted with one or more recycling or disposal companies in the European Union (EU) and these companies will dispose of or recycle this product.

Contact Thermo Fisher Scientific at the address given in the Contacts section of this User Manual for further information on compliance with these Directives and the recyclers in your country.

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Appendix A - Thermo Scientific Tubes Compatible with SampleArray Tube Handler

SampleArray 5220-4896

Catalog Number	Description
3725	Matrix 0.5 mL 2D, polypropylene, V bottom tubes, Sterile, 10 Latch Racks (with DuraSeal tall Lid) of 96 tubes/case
3734	Matrix 500 µl, 2D barcoded, V bottom tubes, 10 Latch Racks of 96 tubes/case
3735	Matrix 500 µl, 2D barcoded, V bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
3736	Matrix 500 µl, 2D barcoded, V bottom tubes with DuraSeal septum inserted, 10 Latch Racks of 96 tubes/case
3737	Matrix 500 µl, 2D barcoded, V bottom tubes with DuraSeal septum inserted, 10 Latch Racks of 96 tubes/case, Sterile
3750	Matrix 500 µl 2D barcoded, V bottom tubes, bulk, 960/case, NS
3743BLU	Matrix 500 µl, 2D barcoded, V bottom, w/ blue caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3743	Matrix 500 µl, 2D barcoded, V bottom, w/ caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3744	Matrix 500 µl, 2D barcoded, V bottom, w/ caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3745	Matrix 500 µl, 2D barcoded, V bottom, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3743GRE	Matrix 500 µl, 2D barcoded, V bottom, w/ green caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3743PUR	Matrix 500 µl, 2D barcoded, V bottom, w/ purple caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3743RED	Matrix 500 µl, 2D barcoded, V bottom, w/ red caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3743WHI	Matrix 500 µl, 2D barcoded, V bottom, w/ white caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3743YEL	Matrix 500 µl, 2D barcoded, V bottom, w/ yellow caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3744BLU	Matrix 500 µl, 2D barcoded, V bottom, w/ caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3744GRE	Matrix 500 µl, 2D barcoded, V bottom, w/ green caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3744PIN	Matrix 500 µl, 2D barcoded, V bottom, w/ pink caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3744PUR	Matrix 500 µl, 2D barcoded, V bottom, w/ purple caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3744RED	Matrix 500 µl, 2D barcoded, V bottom, w/ red caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3744WHI	Matrix 500 µl, 2D barcoded, V bottom, w/ white caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3744YEL	Matrix 500 µl, 2D barcoded, V bottom, w/ yellow caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3730	Matrix 0.75 mL 2D, polypropylene, V bottom tubes, bulk, 1000/case
3731	Matrix 0.75 ml, 2D barcoded, V bottom tubes, 10 Latch Racks of 96 tubes/case
3732	Matrix 0.75 ml, 2D barcoded, V bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
4271	Matrix 0.75 ml, blank, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case
4272	Matrix 0.75 ml, blank, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
4273	Matrix 0.75 ml, alphanumeric, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case

Catalog Number	Description
4274	Matrix 0.75 ml, alphanumeric, polypropylene, round bottom tubes, 10 Latch Racks of 96, Sterile tubes/case
4170	Matrix 0.75 ml, blank, polypropylene, round bottom tubes, bulk, 1000/case
3740	Matrix 1.0 ml, 2D barcoded, V bottom, w/ caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3741	Matrix 1.0 ml, 2D barcoded, V bottom, w/ caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3742	Matrix 1.0 ml, 2D barcoded, V bottom, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3740BLU	Matrix 1.0 ml, 2D barcoded, V bottom, w/ blue caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3740GRE	Matrix 1.0 ml, 2D barcoded, V bottom, w/ green caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3740PUR	Matrix 1.0 ml, 2D barcoded, V bottom, w/ purple caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3740RED	Matrix 1.0 ml, 2D barcoded, V bottom, w/ red caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3740WHI	Matrix 1.0 ml, 2D barcoded, V bottom, w/ white caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3740YEL	Matrix 1.0 ml, 2D barcoded, V bottom, w/ yellow caps, ScrewTop tubes, bulk, 10 bags of 48/case, Sterile
3741BLU	Matrix 1.0 ml, 2D barcoded, V bottom, w/ blue caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3741GRE	Matrix 1.0 ml, 2D barcoded, V bottom, w/ green caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3741PUR	Matrix 1.0 ml, 2D barcoded, V bottom, w/ purple caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3741RED	Matrix 1.0 ml, 2D barcoded, V bottom, w/ red caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3741WHI	Matrix 1.0 ml, 2D barcoded, V bottom, w/ white caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3741YEL	Matrix 1.0 ml, 2D barcoded, V bottom, w/ yellow caps, ScrewTop tubes, 5 Latch Racks of 96 tubes/case, Sterile
3710	Matrix 1.4 mL 2D with human readable text, polypropylene, flat bottom tubes, bulk, 1000/case
3711	Matrix 1.4 ml, 2D barcoded w/ human readable code, flat bottom tubes, 10 Latch Racks of 96 tubes/case
3712	Matrix 1.4 ml, 2D barcoded w/ human readable code, flat bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
3790	Matrix 1.4 ml 2D barcoded, V bottom tubes, bulk, 960/case, NS
3791	Matrix 1.4 ml, 2D barcoded, V bottom tubes, 10 Latch Racks of 96 tubes/case
3792	Matrix 1.4 ml, 2D barcoded, V bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
4140	Matrix 1.4 ml, blank, polypropylene, round bottom tubes, bulk, 1000/case
4247	Matrix 1.4 ml, blank, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case
4248	Matrix 1.4 ml, blank, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
4251	Matrix 1.4 ml, alphanumeric, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case
4252	Matrix 1.4 ml, alphanumeric, polypropylene, round bottom tubes, 10 Latch Racks of 96 tubes/case, Sterile
3794	Matrix 1.4 ml, 2D barcoded, V bottom tubes, 10 Snap Racks of 96 tubes/case
4150	Matrix 1.4 mL, blank, polypropylene, V bottom tubes, bulk, 1000/case
3801	Matrix 1.4 ml, 2D barcoded, V bottom tubes w/ DuraSeal septum inserted, 10 Latch Racks of 96 tubes/case
374500	Nunc 1.8ml Externally Threaded Universal Tubes, non-2D, 10 Racks of 48/case
374501	Nunc 1.8ml Externally Threaded Universal Tubes, 2D coded, , 10 Racks of 48/case
374502	Nunc 1.8ml Externally Threaded Universal Tubes, 2D coded, bulk, 480 tubes/case
374503	Nunc 1.8ml Externally Threaded Universal Tubes, non-2D coded, bulk, 480 tubes/case
374510	Nunc 2.0ml Internally Threaded Universal Tubes, 2D, 10 Racks of 48/case
374511	Nunc 2.0ml Internally Threaded Universal Tubes, non-2D, 10 Racks of 48/case
374512	Nunc 2.0ml Internally Threaded Universal Tubes, 2D coded, 480 tubes/case
374513	Nunc 2.0ml Internally Threaded Universal Tubes, non-2D coded, 480 tubes/case
374221	Nunc 2 ml Cryobank vials, 2D coded, w/ caps, screwcap tubes, 10 racks of 48/case
374258	Nunc 2 ml Cryobank vials, 2D coded, w/ caps, screwcap tubes, 20 bags of 48/case
374259	Nunc 2 ml Cryobank vials, uncoded, w/ caps, screwcap tubes, 20 bags of 48/case

SampleArray 5220-0384

Catalog Number	Description
3815	Matrix 0.1 mL 384 2D tubes, 20 racks of 384 tubes/case

Notes

[illegible]

thermoscientific.com

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